

DRAFT
L.T. MURRAY/QUILOMENE/WHISKEY DICK WILDLIFE AREA
MANAGEMENT PLAN

Washington Department of Fish and Wildlife



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2006

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CHAPTER I. INTRODUCTION

The Washington Department of Fish and Wildlife (WDFW) is entrusted with the management of fish and wildlife, and on WDFW State-owned lands with the preservation of the natural resources associated with those properties. As a steward of the land, the WDFW is dedicated to protecting, restoring, and perpetuating healthy ecosystems throughout the State while fostering an attitude of partnership with the community. WDFW is responsible for the protection and management of all marine, anadromous and freshwater fish; shellfish; and terrestrial wildlife—thousands of animal species Statewide. WDFW regulates all legal harvest of commercial fish, sport fish and wildlife, enforces wildlife protection laws, as well as managing about 840,000 acres of land.

WDFW developed Washington’s Comprehensive Wildlife Conservation Strategy as a guiding document to protect species from extinction. Included in that document are biodiversity protection measures along with species-specific protection measures. Many of the wildlife highlighted in this document occur on the L.T. Murray/Whiskey Dick/Quilomene Wildlife Areas (part of the L.T. Murray/Wenas Wildlife Areas Complex). The species accounts (Section 2.11) in the plan document basic information available so these species will not be left behind during management considerations. However, single species management may be highlighted as an emphasis in a particular area, while preserving basic habitat needs for overall species diversity as well. In other cases, wildlife biodiversity will be the emphasis for particular habitat types.

The L.T. Murray/Whiskey Dick/Quilomene Wildlife Areas fits within the East Cascades and Columbia Plateau Eco-regions. Ecosystem assessments were used in providing guidance to the Comprehensive Wildlife Conservation Strategy development. The wildlife area plan utilizes both these documents in guiding management for the project.

This plan provides the specific management direction for the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. This plan will be updated annually to maintain its value as a flexible working document. It identifies needs and guides activities on the area based on the Washington Department of Fish and Wildlife (WDFW) Agency Mission of “Sound Stewardship of Fish and Wildlife” and its underlying statewide goals and objectives as they apply to local conditions.

1.1 Agency Mission Statement

The Washington Department of Fish and Wildlife serves Washington’s citizens by protecting, restoring and enhancing fish and wildlife and their habitats, while providing sustainable fish and wildlife-related recreational and commercial opportunities.

1.2 Agency Goals and Objectives

The following goals and objectives directly apply to the management of this wildlife area. These goals and objectives are found in the Agency’s Strategic Plan.

Goal I: Healthy and diverse fish and wildlife populations and habitats

- Objective 2: Protect, restore and enhance fish and wildlife populations and their habitats.
- Objective 3: Ensure WDFW activities, programs, facilities and lands are consistent with local, state and federal regulations that protect and recover fish, wildlife and their habitats.
- Objective 5: Minimize adverse interactions between humans and wildlife.

Goal II: Sustainable fish and wildlife-related opportunities

- Objective 6: Provide sustainable fish and wildlife-related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats.

- Objective 7: Improve the economic well-being of Washington by providing diverse, high quality recreational and commercial opportunities.

Goal III: Operational Excellence and Professional Service

- Objective 11: Provide sound operational management of WDFW lands, facilities and access sites.
- Objective 15: Reconnect with those interested in Washington's fish and wildlife.

1.3 Agency Policies

The following agency policies provide additional guidance for management of agency lands.

- Commission Policy 6003: Domestic Livestock Grazing on Department Lands
- Policy 6010: Acquiring and disposing of real property
- Policy 5211: Protecting and Restoring Wetlands: WDFW Will Accomplish Long-Term Gain of Properly Functioning Wetlands Where Both Ecologically and Financially Feasible on WDFW-Owned or WDFW-Controlled Properties
- Policy 5001: Fish Protection At Water Diversions/Flow Control Structures And Fish Passage Structures
- Policy: Recreation management on WDFW Lands
- Policy: Commercial Use of WDFW Lands
- Policy: Forest Management on WDFW Lands
- Policy: Weed Management on WDFW Lands
- Policy: Fire Management on WDFW Lands
- Other policies/contractual obligations/responsibilities

1.4 L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas Goals

Management goals for the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas are to preserve habitat and species diversity for both fish and wildlife resources, maintain healthy populations of game and non-game species, protect and restore native plant communities, and provide diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas. Specific management goals and strategies for the L.T. Murray/Quilomene/Whiskey Dick Wildlife Area can be found in Chapter 3.

1.5 Planning Process

A multifaceted approach has been undertaken to identify strategies proposed for management of the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. This process included identifying agency goals and objectives that apply to the area; a review of the purpose for purchasing the area; a review of existing habitat conditions and species present; the formation of a Wildlife Area Citizens Advisory Group (CAG); and input and review by an internal District Team consisting of local agency representatives from each agency program. The district team also helped to identify other species or habitat plans and documents pertinent to the management of the area.

Public participation, through the formation of the CAG, will be used as an ongoing means to identify social, cultural, and economic issues important to the people of Washington and the management of the wildlife area. The group will also provide input to help resolve current and future management issues and conflicts. CAG participation in planning will add credibility and support for land management practices and help build constituencies for wildlife areas. The CAG

is made up of one representative from each major stakeholder group. CAG members are spokespersons for their interest groups.

Table 1. Colockum/L.T. Murray/Wenas/Oak Creek Wildlife Areas Citizens Advisory Group Representation.

Name	Representing
Bailey, Ken	Non-Motorized Recreation (hikers, horse backers, bicyclists, campers, cross-country skiing, kayaks, photographers, etc.)
Ballard, Shawn	Archery
Baskin, Tom	Disabled Sportsmen, Recreationists
Beck, Dan	Central Washington University (Biology)
Bloomfield, Betsy	The Nature Conservancy
Davis, Todd	Chelan, Kittitas, Yakima Co. Weed Boards
Eaton, Bob	Livestock interests
Essman, Bill	Kittitas Co. Field & Stream Club, and Hunting / Fishing interests
Forbes, Pete	U.S. Forest Service, Naches Ranger District
Fulwiler, Neil	Adjacent landowner
Hale, Mike	RMEF / NGO's / MDF / FNAWS
Hankins, Wes	NWTF / Bird Hunters / Hunting interests / Dog Training
Hedges, Neal	U.S. Bureau of Land Management
Juette, Randy	Commercial Use / Tourism
Kinney, Dan	Audubon Society
McNamee, Ken	Department of Natural Resources
Paolella, Ray	Cowiche Canyon Conservancy
Stegeman, Bill	Wenatchee Sportsman's Assoc.
Stephenson, Jim	Yakama Nation
Warnock, Doug	Big Game Management Roundtable
White, Bill	LMAC
Witke, Don	Wenas Muzzleloader Club
Zeimantz, Paul	Motorized Recreation (4 wheelers, motorcycles, jeeps, snowmobiles, boats, etc.), WSSA, WS Parks

Individuals representing these entities will provide input during the planning process.

Plans will incorporate cross-program input and review at the regional and headquarters level by the habitat program, wildlife program, enforcement program, and fish program. Pertinent information from existing species plans, habitat recommendations (including the Comprehensive Wildlife Conservation Strategy), watershed plans, ecoregional assessments, etc will be used to identify local issues and needs and ensure that the specific Wildlife Area Plan is consistent with WDFW statewide and regional priorities.

The L.T. Murray/Quilomene/Whiskey Dick plan will be reviewed annually with additional input from the CAG and district team to monitor performance and desired results. Strategies and activities will be adapted where necessary to accomplish management objectives.

CHAPTER II. AREA DESCRIPTION AND MAP

2.1 Property Location and Size

The L.T. Murray Wildlife Area is located in Central Washington, approximately 15 miles west of the city of Ellensburg, in Kittitas County. Of the 54,070 acres that make up the L.T. Murray, the Washington Department of Fish and Wildlife (WDFW) owns 39,305 acres. The Washington Department of Natural Resources (WDNR) owns 14,424 acres, which is currently either leased to WDFW or under WDFW management. The United States Forest Service (USFS) owns 341 acres on the L.T. Murray in the Taneum drainage.

The Quilomene/Whiskey Dick Wildlife Areas are situated approximately 15 miles northeast of the city of Ellensburg in Kittitas County. The combined acreage under WDFW control for both the Quilomene and Whiskey Dick is 46,352 acres. Of this total, WDFW owns 11,523 acres in the Quilomene, and 17,027 in the Whiskey Dick. 6,280 acres are owned by WDNR in the Quilomene, and 11,522 acres are owned by WDNR in the Whiskey Dick. Additionally, there are approximately 600 acres owned by the Bureau of Land Management (BLM) within the boundaries of the Quilomene Wildlife Area, and approximately 1,960 acres owned by BLM within the boundaries of the Whiskey Dick Wildlife Area that are managed as part of the wildlife areas.

In addition, the agency acquired 5,441 acres of the Skookumchuck drainage in early 2006. This provides a much needed connection between the Quilomene and Whiskey Dick Wildlife Areas and will be managed as part of this complex.

The L.T. Murray, Quilomene and Whiskey Dick are managed by WDFW as part of the L.T. Murray/Wenas Wildlife Areas, which is comprised of just over 211,300 acres in Yakima and Kittitas Counties.

WDFW lands encompasses all or portions of sections within T.17, R.16, R.17, R.18, R.21, R.22; & T.18, R.16, R.17, & T.19, R.16, R.22 (North L.T. Murray); T.17, R.22, & T.18, R.21, R.22 (Whiskey Dick and Skookumchuck) and T.18, R.21, R.22 & T.19, R.21, R.22 (Quilomene). Many are interspersed with DNR lands which are being considered for exchange with WDFW in an attempt to block up ownerships for management efficiencies.

Figure 1. Map of L.T. Murray/Quilomene/Whiskey Dick Wildlife Area

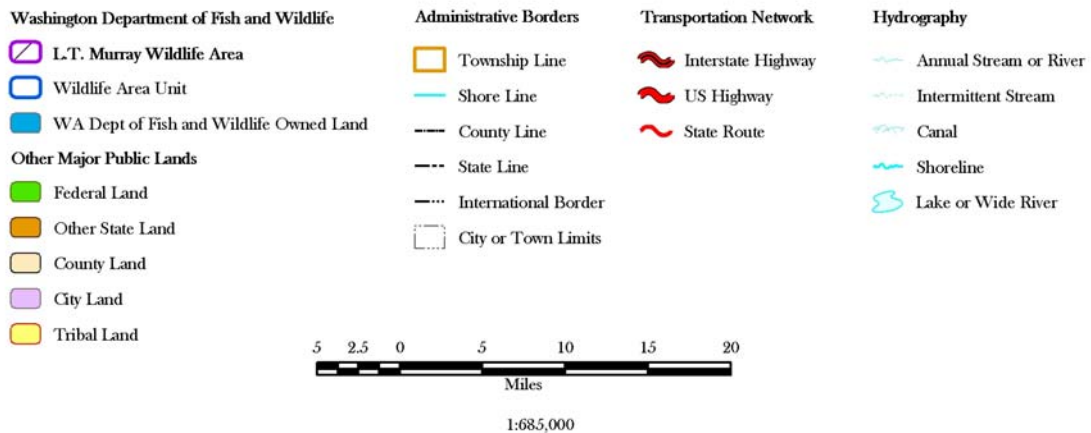
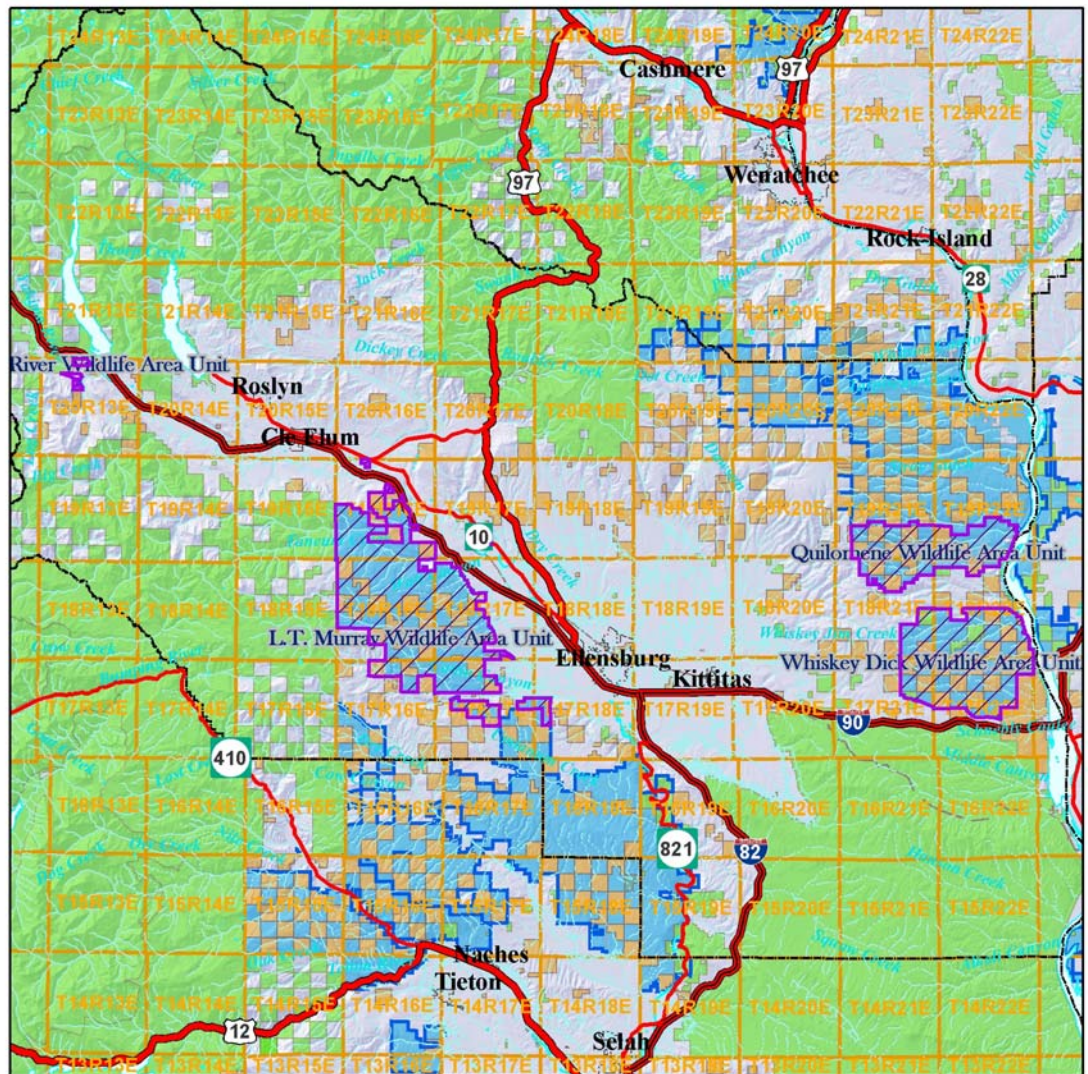
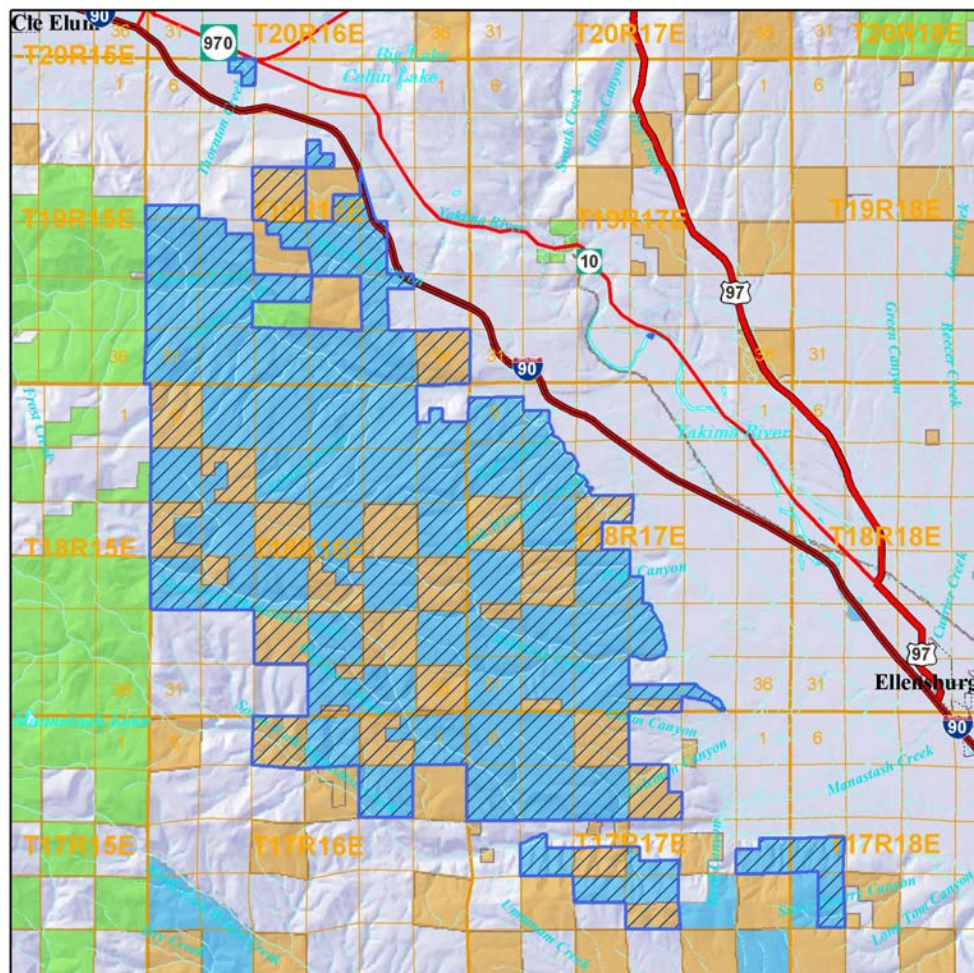


Figure 2. L.T. Murray Wildlife Area Unit



Washington Department of Fish and Wildlife

- L.T. Murray Wildlife Area Unit
- Conservation Easement
- WA Dept of Fish and Wildlife Owned Land
- Major Public Land Ownership**
- Federal Land
- Other State Land
- County Land
- City Land
- Tribal Land

Administrative Boundaries

- Township Line
- Section Line
- Shore Line
- County Line
- State Line
- International Border
- City or Town Limits

Transportation Network

- Interstate Highway
- US Highway
- State Route

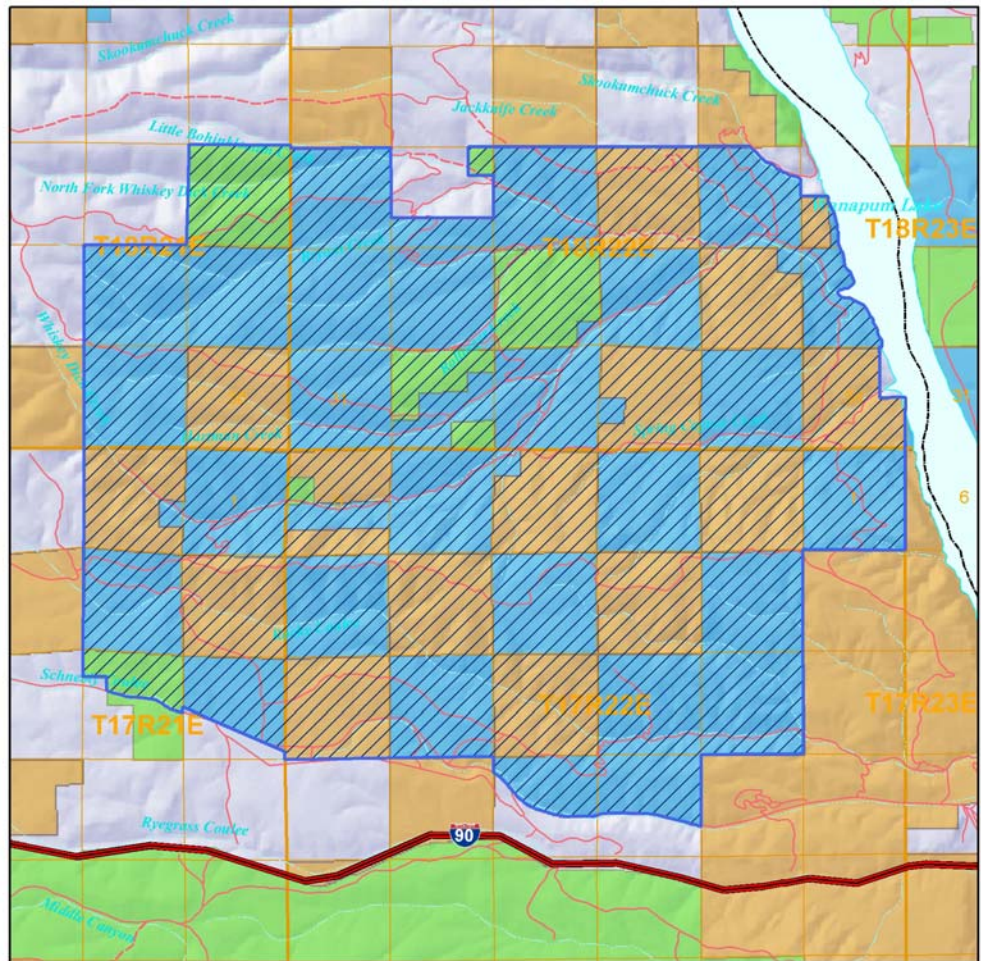
Hydrography

- Annual Stream or River
- Intermittent Stream
- Canal
- Shoreline
- Lake or Wide River

1:190,000

1 inch equals 3 miles

Figure 3. Whiskey Dick Wildlife Area Unit



Washington Department of Fish and Wildlife

Whiskey Dick Wildlife Area Unit

Conservation Easement

WA Dept of Fish and Wildlife Owned Land

Major Public Land Ownership

Federal Land

Other State Land

County Land

City Land

Tribal Land

Administrative Boundaries

Township Line

Section Line

Shore Line

County Line

State Line

International Border

City or Town Limits

Transportation Network

Interstate Highway

US Highway

State Route

Secondary Road

Trail

Hydrography

Annual Stream or River

Intermittent Stream

Canal

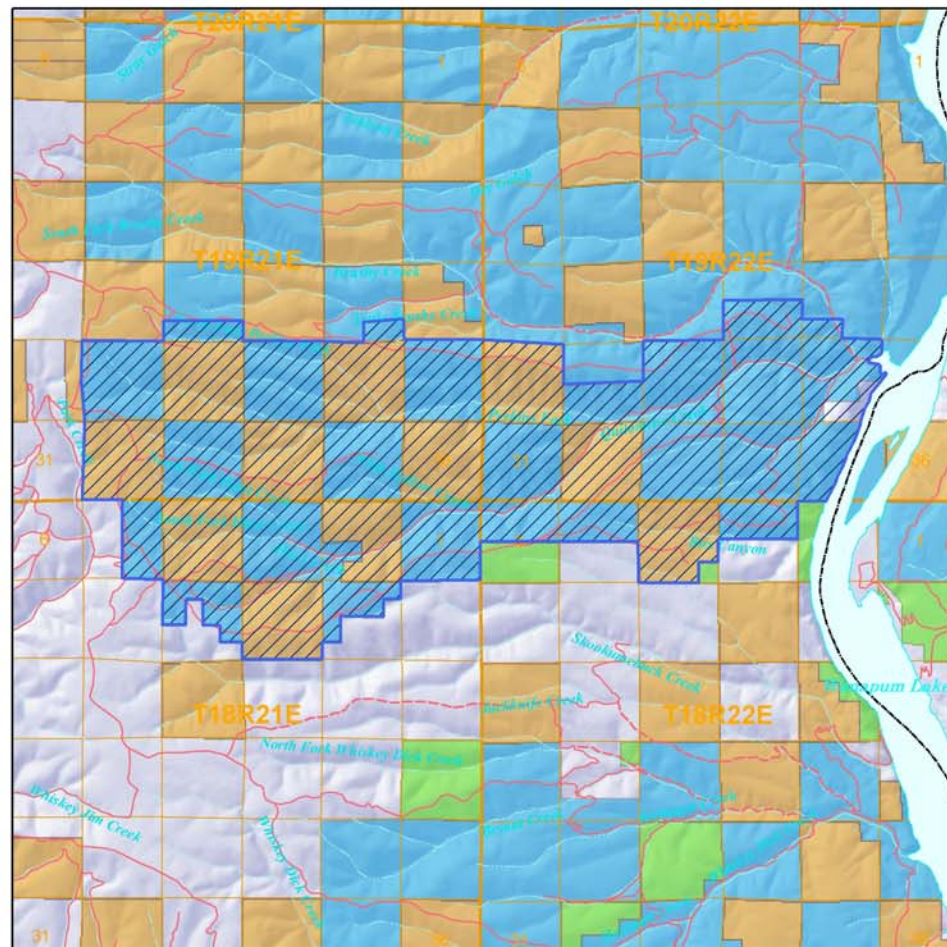
Shoreline

Lake or Wide River


1:100,000


1 inch equals 1.6 miles

Figure 4. Quilomene Wildlife Area Unit



Washington Department of
Fish and Wildlife





-  Quilomene Wildlife Area Unit
 Conservation Easement

-  WA Dept of Fish and Wildlife Owned Land

Major Public Land Ownership

-  Federal Land
-  Other State Land
-  County Land
-  City Land
-  Tribal Land





Administrative Boundaries

-  Township Line
-  Section Line
-  Shore Line
-  County Line
-  State Line
-  International Border
-  City or Town Limits

Transportation Network

-  Interstate Highway
-  US Highway
-  State Route
-  Secondary Road
-  Trail

Hydrography

-  Annual Stream or River
-  Intermittent Stream
- Canal
-  Shoreline
-  Lake or Wide River

1:125,000

1 inch equals 2 miles

2.2 Purchase History and Purpose

The L.T. Murray Wildlife Area was purchased by the Washington State Department of Game in 1968 from Ellensburg rancher and logger Lowell T. Murray, and is dedicated in his name. The purchase was made to provide and protect critical winter range for deer and elk, as well as perpetuate and improve the upland game bird habitat. Funding for the purchase was an even split between Federal dollars from the Bureau of Outdoor Recreation (BOR), and State dollars from the Interagency Committee for Outdoor Recreation (IAC).

The first land acquisition in what would become the Quilomene/Whiskey Dick Wildlife Areas was in 1962 when the Washington State Department of Game purchased 11,180 acres of rangeland in the Quilomene area. Subsequent purchases were 17,027 acres in the Whiskey Dick area in 1966, and 343 acres in the Quilomene in 1974. All funding was provided by the Interagency Committee for Outdoor Recreation (IAC Grant Program). The purpose of these acquisitions was to expand the winter range for the Colockum deer and elk herds, and to perpetuate and improve the upland game bird habitat.

The Department of Game later merged with the Department of Fish and became the Washington Department of Fish and Wildlife (WDFW) in 1993.

Early management of the L.T. Murray and Quilomene/Whiskey Dick Wildlife Areas began with management assistants and temporary labor directed by the Oak Creek Wildlife Area manager out of Yakima. Work consisted of fencing boundaries, signing entrances, coordinating and monitoring grazing leases, developing springs and habitat plots, and installing bird feeders and guzzlers. In April of 1976, the first permanent manager position was assigned to the L.T. Murray. Long-term plans, budgets, and Pittman-Robinson federal funding were secured for the project to continue operations and maintenance as well as capital developments. Boundary surveys, habitat enhancement projects, road management programs, and a complete review of domestic livestock grazing on all the areas were the first priorities.

As a condition of the sale, the timber rights were reserved by Mr. Murray for a period of twenty-five years. Timber harvest in the late 1970's resulted in numerous large clear-cuts, which were seeded by helicopter with palatable grasses for wildlife and to deter weed invasions. The timber rights reverted back to WDFW on October 31, 1993.

Alteration of the plant community has occurred over the years as a result of grazing, invasive exotic plant species, and fire. Historically, nearly all areas of the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas had intensive livestock grazing of one form or another. On the L.T. Murray, as a condition of the sale, the grazing rights were reserved for ten years. Research and studies were conducted to determine impacts of livestock grazing on the various areas, and grazing was gradually reduced where it was not compatible with wildlife and habitat objectives. Grazing on the L.T. Murray and the Quilomene/Whiskey Dick was eventually discontinued in order to provide winter and spring forage for big game species, particularly elk.

Approximately 25 miles of stock fence on the Quilomene/Whiskey Dick has been maintained to guard against livestock trespass, protect shrub steppe habitat, and restrict vehicular access into sensitive areas, thereby reducing damage to herbaceous cover needed for nesting and foraging by shrub steppe obligate species. The restriction of vehicle access, and livestock trespass also reduces

the spread of undesirable weedy vegetation. These fences are inspected and repaired each spring prior to the livestock-grazing season.

In years past when livestock grazing was practiced on the Wildlife Area, numerous springs were developed to promote the dispersal of stock throughout the area and avoid concentrated use in the riparian corridors, those being the only places in which stock water was in abundance. Several of those springs have been maintained for use by wildlife. Cleaning and maintenance has been accomplished both by staff and volunteers.

Numerous roads and areas on the L.T. Murray as well as on the Quilomene/Whiskey Dick are treated annually to reduce non-native invasive vegetation. Treatments include herbicides, mechanical measures, and biological agents (insects). Where needed, native grasses are planted in treated areas to supplant weedy vegetation. Plans are underway to re-establish native-like vegetation on areas formerly used for intensive livestock grazing. This began in the fall of 2003 and will continue as needed.

Habitat enhancement projects continue, and in compliance with State Forest Practice regulations, a complete Road Maintenance and Abandonment Plan (RMAP) has been completed for the forested portions of the L.T. Murray Wildlife Area. Further field review, site planning, and road maintenance or abandonment work is scheduled through 2020. Numerous roads have been closed on the L.T. Murray since WDFW acquired it, including 21 miles closed under implementation of RMAP. Roads open for motorized travel are managed under the Green Dot road management system put in place in 1990. Green Dot maps are updated every two years to reflect closures and changes. WDFW will be conducting a comprehensive review of the Green Dot road management system in the Quilomene/Whiskey Dick to ensure that roads open to vehicular travel are not causing resource damage.

2003 and 2004 also saw the completion of the first timber thinning/habitat improvement projects since the L.T. Murray timber rights reverted to WDFW. More thinnings are scheduled as part of a long-range plan developed to address fuels loading, insect and disease issues, and catastrophic fire danger, as well as habitat improvement. It is anticipated that these thinning projects will help reduce the potential damage to wildlife habitat as well as adjacent property by catastrophic wildfire.

The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas provide innumerable opportunities for public users to enjoy outdoor recreational activities. Two of the most important uses are hunting and wildlife viewing. Reducing road densities and enhancing wildlife habitat have positive impacts on both activities. Thousands of visitors each year enjoy hunting, fishing, camping, and wildlife viewing on the Murray. Additionally an increasing number visit the Wildlife Area to hike, horseback, bicycle, or bird-watch for just a day outing. As in most areas of the state, the Wildlife Area has also seen a dramatic rise in non-wildlife oriented recreation use including ATV and snowmobile use, jeeps, “mudders”, and target shooters.

2.3 Ownership and Use of Adjacent Lands

The L.T. Murray Wildlife Area is bordered on the west by USFS land managed as part of the Okanogan/Wenatchee National Forest. The northern border primarily consists of timbered land and shrub steppe owned by timber companies, land developers, or private individuals, and the eastern side is bordered by privately owned agricultural lands. To the south the boundary is formed

by Manastash Road or Manastash Ridge, with private, state and Federal lands interspersed along that side. Additionally, the Mellergaard property is the southernmost sub-unit of the L.T. Murray. It lies along the west side of the Yakima River between Manastash Ridge to the north, and Umtanum Ridge to the south, with the western border being the Durr Road.

The Quilomene and Whiskey Dick Wildlife Areas historically were disjunct, with the 20,069-acre privately and DNR-owned Skookumchuck drainage dividing them (the 17,803-acre Quilomene to the north, and the 28,549-acre Whiskey Dick to the south). In early 2006, WDFW acquired 5,441 acres of the privately-owned portion of the Skookumchuck. This provides a much-needed connection between the two wildlife areas. Lands to the west of both segments are privately owned. Most of the privately owned adjoining lands are used for grazing of livestock, and for recreational purposes. The northern border of the Quilomene portion is formed by the Colockum Wildlife Area (WDFW). The Columbia River is the eastern border of the Quilomene and a portion of the Whiskey Dick, and Washington Parks and Recreation's Ginkgo State Park forms the remainder of the eastern border of the Whiskey Dick.

For over 35 years, WDFW has leased approximately 125,000 acres of shrub steppe and partially timbered lands from the Department of Natural Resources. These lands are common school trust lands that are managed by DNR to generate revenue for school construction. The lands are intermixed with Department of Fish and Wildlife (WDFW) ownerships in Eastern Washington primarily on the Oak Creek, Wenas, L.T. Murray, Whiskey Dick, Quilomene and Colockum Wildlife Areas.

For the 2003-05 biennium the Fish and Wildlife Commission reduced funding for those leases by \$270,000/biennium as part of a much larger general fund reduction for the department. That action significantly increased the risk to those lands of conversion, sale, exchange or lease for purposes potentially incompatible with fish and wildlife. To address this issue, the Fish and Wildlife Commission and legislature have approved a plan to exchange land between the two agencies. WDFW would trade approx. 45,000 acres of forested lands in Kittitas and Yakima counties to DNR in exchange for 125,000 acres of shrub steppe lands. The exchange would also allow WDFW to take ownership of 12 water access sites that were also leased from DNR.

The exchange of lands will be on value for value basis and the exact ownerships or boundary of the exchange will not be known until appraisal and timber valuations have been completed. The legislature approved funding for WDFW to begin the appraisal and review process in the 2006 legislature and the agencies expect to exchange lands sometime in 2007.

This land exchange is subject to the National Environmental Policy Act since most of WDFW's lands were purchased and have been maintained with federal funds.

The land exchange will allow both agencies to manage their properties more efficiently since it consolidates a large portion of their respective ownerships. It also significantly increases the certainty that 'at risk' shrub steppe lands will be protected in perpetuity for fish and fish and wildlife and related recreation.

2.4 Funding

The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas are funded under the Federal Pittman Robinson (PR) program, which provides operating monies for qualifying Wildlife Areas. The L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas have a combined annual PR budget of \$72,139 (75% federal, 25% state match). An additional \$28,000 per year is provided by state general funds. This funding also covers the North Cleman Mountain portion (31,250 acres) of the Wenas Wildlife Area. In addition, WDFW recently leased a section of the Whiskey Dick Wildlife Area to Puget Sound Energy for placement of wind towers. The annual lease payment is unknown at this time, but is anticipated to provide at least \$50,000 per year in additional funding to the L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas, a great need given the current inadequate funding level.

Portions of three full time staff positions are supported including:

.40fte Wildlife Area Manager (Fish and Wildlife Biologist 3)

.75fte Fish and Wildlife Biologist 2

1.0fte Habitat Tech 1

The Wildlife Area is currently, and has been historically, understaffed, which results in many projects and maintenance needs being sidelined or postponed. This is simply due to the sheer size of the area and the area it covers (spanning portions of two counties covering almost 330 square miles) and the inadequate funding. The combined PR and state general funds provide **\$0.73/acre** for management of these lands. If the L.T. Murray/Wenas Complex remains a complexed wildlife area, it will be necessary to add additional staff to keep up with the ever-increasing workload of managing these lands for wildlife. This is already a requisite, and with additional acquisitions anticipated in the Skookumchuck and other areas of Kittitas County coming under management of this wildlife area complex, additional full time staff will be essential.

The Department will, as part of the implementation of this plan, submit grant proposals and applications and identify other strategies to address unfunded management needs on the wildlife area.

2.5 Climate

Climate is the most important environmental factor influencing the region. Lying in the “rain shadow” of the Cascade Mountains, precipitation measuring less than 16 inches falls annually on the eastern extreme of the L.T. Murray, but up to 100 inches of snow may fall in the higher more westerly locations. Elevations on the Murray range from 2,000 feet to near 4,500 feet, contributing to the widespread ecological diversity.

The Cascade Mountains also influence the Quilomene/Whiskey Dick region’s climate, along with the prevailing westerly winds. The area ranges in elevation from 550 feet above sea level at the Columbia River on the east, to 3,200 feet in the northwest corner (a distance of some 10 miles). Total precipitation ranges from nine to eleven inches annually, with the majority coming during the winter months.

2.6 Soils and Geology

The L.T. Murray Wildlife Area, characterized by steep ridges, rounding hills, and eroding plateaus, lies in a geological region known as the “Yakima Marginal Folds”. Drainage is eastward from the

Cascade Mountains to the Yakima River where it traverses the fertile Kittitas Valley and where it makes a series of deep, meandering cuts through uplifted lava basalt creating the spectacular Yakima Canyon. On the lower southeastern segment of the L.T. Murray, terrain is steep and broken, or is shallow-soiled scabland. Ranging north and westward forest soil types prevail, broken by deeper-soiled meadows.

The Quilomene/Whiskey Dick area is characterized by steep, rocky slopes, and a rolling series of ridges and canyons that generally drain west to east. The parent bedrock material in the region consists of basaltic rock, and includes fractured and folded lava flows. The basalt material has weathered down into coarse gravels, cobbles, and boulders, with fine silts and clays. The overlying soil is composed of fine-grained loess, deposits of volcanic ash, sandy loams, and silt loams.

2.7 Hydrology and Watersheds

The L.T. Murray extends in a band approximately 11 miles wide from south of the city of Cle Elum to the top of Manastash Ridge. The lower portions of two major drainages, Taneum Canyon on the north and Manastash Canyon on the south, are within the boundaries of the Wildlife Area. The streams in these canyons flow west to east and empty into the Yakima River. Numerous smaller perennial and intermittent stream channels feed these two major drainages. The timbered portions of the L.T. Murray form the upper watersheds that culminate in Taneum and Manastash Canyons, and the agricultural lands of the eastern Kittitas Valley.

The Quilomene Creek basin lies in the dry, shrub-steppe habitat along the Columbia River northeast of Ellensburg. The similar Whiskey Dick Creek basin lies south of the Quilomene. Little snow pack accumulates, so flows are not greatly influenced by spring snowmelt. Flows remain fairly constant due to the springs scattered throughout the drainage (WDFW 2003). Quilomene Creek, Whiskey Dick Creek, and some of their tributaries provide habitat for resident trout. Steelhead have been documented in Quilomene Creek. Several smaller tributary streams connect to the larger Quilomene and Whiskey Dick drainages, which flow to the Columbia.

2.8 Fire History

Vigorous fire protection, development of ladder fuels, over-stocking, and insect and disease infestations have made timber stands on the L.T. Murray susceptible to fire replacement. Over the years, several small fires have broken out on the L.T. Murray. In 1994, three such fires started by lightning burned a total of 300 acres. These were known as the “Murray Complex” fires. In 2003 the “Elephant Head” fire in Taneum Canyon burned 250 acres as a result of arson. In 2004 the “North Riggs fire burned approximately 70 acres. Fortunately the Wildlife Area has escaped a truly devastating catastrophic wildfire, but is certainly at high risk for one. This is one of the principal motivators for planning and implementing thinning/habitat improvement projects on the Wildlife Area. It is hoped that enough of this work can be completed to avoid loss of human life, wildlife, habitat, watershed, and timber resources from wildfire. Prescribed burning will be an integral part of these projects as well. WDNR is responsible for wildfire protection on the L.T. Murray.

On the Quilomene/Whiskey Dick wildfires burned 7,000 acres on the Quilomene in 1976, 10 acres along Quilomene Bay in 1995, 50 acres at Quilomene Bay in 2001, and approximately 850 acres (in two separate fires along the Vantage Highway) on the Whiskey Dick in 2003. The Quilomene/Whiskey Dick Wildlife Area is outside the Kittitas County Fire District. An Emergency fire suppression agreement (#05-282) between WDFW and DNR has been in effect since 5/27/05 and will remain so until June 30, 2010. The Quilomene and Whiskey Dick Wildlife Areas are captured under this agreement. Kittitas County Fire District #4 (Vantage, WA) will also respond to fires on the Whiskey Dick Wildlife Area.



Whiskey Dick Fire- August 2003

Uncontrolled wildfires in shrub steppe habitat such as the Quilomene/Whiskey Dick can significantly alter the landscape by eradicating sagebrush which shrub steppe obligate species, such as sage grouse, sage thrasher, and sage sparrow, depend upon for both food and cover (big sagebrush, *Artemisia tridentata*, is killed by fire). In addition, where weeds are common, these species may out-compete natives (particularly grasses) after a fire and spread throughout burned areas, diminishing the diversity of the plant community with species that are less palatable to wildlife. It has been management policy to follow a wildfire event with the planting of native or near-native species of grasses and forbs in areas vulnerable to invasion by weeds.

2.9 Vegetation Characterization



Transitional Zone: Grassland interspersed with rock outcrops and Shrub-steppe

Approximately 33,000 acres of the L.T. Murray are conifer forest, and the balance is predominantly shrub steppe, with both being interspersed with riparian corridors. Vegetation ranges from the lower elevation shrubs and bunch grasses into ponderosa pine, then to higher elevations with denser stands of timber comprised mostly of Douglas fir, grand fir, and some western larch. Grasslands interspersed with rock outcrops and shrub-steppe communities dominate hillsides in transitional zones. The dominant grass communities consist of wheat grasses, fescues, bluegrasses, and a variety of forbs. Common shrub species are bitterbrush, ceanothus, snowberry, rose, serviceberry, and

several currants. These dense stands of trees and/or shrubs provide hiding, escape and thermal cover, shade, foraging and nesting sites, perches, and water sources. For further review stand conditions pertaining to the east cascade slopes are defined in Chappell et al. 2001).

Vegetation in the Quilomene/Whiskey Dick is more limited to shrub steppe species, predominantly consisting of sagebrush and bitterbrush mixed with various bunchgrasses. Streams and springs provide narrow bands of riparian habitat. All of these highly productive communities often contain both plant and wildlife species that are endangered or threatened.

2.10 Important Habitats

Steep and rocky hillsides and cliffs characterize some of the higher elevations, and the transition from shrub steppe into timber makes for a wide range of diverse habitat for many species of wildlife.

Shrub steppe – The majority of the arid Quilomene/Whiskey Dick Wildlife Areas, and much of the L.T. Murray Wildlife Area is comprised of shrub steppe habitat (predominantly sagebrush and/or bitterbrush mixed with various bunchgrasses). Certain portions exhibit some of the state's best remaining native shrub-steppe communities. This cover type will be significant in WDFW's future sage grouse restoration efforts.



Shrub Steppe Habitat

Forest – A large portion of the L.T. Murray is forest habitat. Forest habitat on the Quilomene/Whiskey Dick is limited primarily to small, select areas in the northwestern portion of the Quilomene near the border with the Colockum.

Riparian – The L.T. Murray has extensive riparian habitat along the North Fork Manastash, as well as the Taneum and smaller tributaries. Riparian habitat in the Quilomene/Whiskey Dick is typically confined to areas along very narrow stream corridors. This cover type is a primary factor influencing the quality and health of fish habitat. Riparian vegetation provides thermal cover and is an important habitat for sage grouse. It also creates stream channel features such as pools, and maintains stream bank stability.

Talus/Cliffs – There are many areas of exposed rock or fields of broken rock. These landscape features provide key habitat requisites that are often missing for various species such as bighorn sheep, golden eagles and peregrine falcons.

2.11 Fish and Wildlife

The protection and enhancement of wildlife and wildlife habitat is the number one priority when developing management strategies on the Wildlife Areas. Wildlife use is diverse, with species present including elk, deer, big horn sheep, sage grouse, turkey, quail, and a myriad of small

mammals, neo-tropical/upland birds, raptors, and reptiles. There are numerous fish-bearing streams on the Wildlife Areas that contain resident trout. Additionally, there are streams and their tributaries that historically contained anadromous stocks that are currently federally listed. WDFW and other state and federal agencies are actively pursuing the removal of barriers from these streams to re-establish anadromous use. Great care is taken so that fishery resources are not impacted by management practices. The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas is dedicated to the management and protection of its habitat and wildlife species.

Rocky Mountain Elk

Elk are the second largest wild ungulate residing in Washington State. Zoo archaeological data from the Columbia Basin suggest elk were present and utilized by early inhabitants (Dixon et al. 1996 and McCorquodale 1985). As late as the 1800's elk may have been extirpated from the central Washington region (McCorquodale 1985). The current Yakima elk herd developed from the re-introduction of Rocky Mountain Elk from Yellowstone National Park in 1915 (Bryant and Maser 1982 and Pautske 1939).



The L.T. Murray Wildlife Area is used by the northern portion of the Yakima elk herd (Game Management Units (GMU) 336, 340 and portions of 342) at various levels throughout the year. When feeding operations are ongoing, many congregate at the Joe Watt and Robinson feed lots. Free ranging elk use winter range from the Yakima Canyon west to Hanson Ponds. Plans for maintaining target herd numbers, managing hunting seasons, and addressing depredation problems on neighboring lands etc. is addressed in the 2002 Yakima Elk Herd Plan.

Elk Wintering in Robinson Canyon

The Yakima Elk Herd plan (2002) currently has elk herd objective goals of 9500 elk while the 2003-2009 Game Management Plan has a range of 9,025-9,975 elk. These plans provide detailed guidance in herd management.

A current study by WDFW of the Yakima Elk herd is nearing completion that will identify distribution and seasonality of use and is directed at identifying what habitats are most important and how elk use the range with regards to habitat and human use. A concurrent study is underway by the USFS dealing with the habitat components of forest that is a critical component of these efforts.

Elk inhabit the Whiskey Dick and Quilomene (GMU 329) particularly during the winter when significant portions of the Colockum elk herd reside from November through early May. In the Colockum Elk Herd Plan, the herd goal is 4,275-4,725. A small number of elk may stay year around where there is water and cover and without significant disturbance. These units were purchased specifically for big game winter range, recognizing that other wildlife would benefit

from the protection it affords them as well. Recent wind power developments and rapid increased use of ATV's are significant issues needing attention for successful management of this component of the Colockum elk herd.

How elk use forage and cover depend on the season, land use influences, and human disturbance. Elk need forage and water year around but use it differently during spring, summer, fall and winter in relation to weather conditions and particularly human disturbance. Habitat and human disturbance influence where and how often elk will use various areas. All these factors play into the management activities for successful elk management.

The Wildlife Area Plan and Yakima and Colockum Elk Herd Plans will have interactive management to insure that they are in alignment. Ensuring habitat protection, habitat enhancement and limiting human disturbance are critical functions the Wildlife Area Manager will have to deal with for both the Wildlife Area plan and the herd plans to be successful. Specific items needing management actions include: livestock grazing management, vehicle access management, fire protection, management of old agricultural fields, noxious weed management and general human access management.

Additional work to solve problems created by elk on private ownership is being done by a Kittitas County group called the Big Game Management Round Table. This group is a cross section of farmers, ranchers, concerned citizens, and various agency people who have come together to seek solutions to the continuing problem of agricultural damage to private interests by elk. Also, the Rocky Mountain Elk Foundation is currently developing an East Slope Conservation initiative. The goal of this process is to produce a series of conservation strategies for the East Slope Cascades region that are shared by the majority of stakeholders and to lay out a plan for action associated with each strategy.

Rocky Mountain Mule Deer

Mule deer have been an important member of eastern Washington's landscape, serving as a food and clothing source for Native Americans prior to settlement by Euro-Americans. Today mule deer remain an important component of the landscape, providing food for Native Americans, recreational opportunities for hunters and wildlife watchers, and tremendous economic benefits to local communities and the state of Washington. Mule deer range throughout the L.T. Murray-Whiskey Dick-Quilomene Wildlife Areas (GMU's 329,336, 340 & portions of 342), and occupy various habitats from alpine areas in the Cascades, to the shrub steppe/grassland habitats along the eastern fringes next to the Yakima and Columbia Rivers. Summer range consists of bunchgrass communities interspersed with timber stands that provide fawning and hiding cover in the western part of the Wildlife Area. The eastern part of the L.T. Murray and all of the Whiskey Dick/Quilomene provides winter and spring forage in the form of bunchgrass and particularly Sandberg's bluegrass communities. Mule deer on the L.T. Murray have interbred with black-tailed deer.

The most important habitat factors affecting deer in these areas are the availability of suitable forage to survive harsh winter conditions and spring green up in preparation for fawning time.

California Bighorn Sheep

Bighorn sheep were native to Washington and archeological evidence showed they inhabited the uplands throughout the Yakima and Columbia River areas. Bighorns were extirpated from

Washington around 1930 and efforts to bring them back were initiated in the 1950,s and continue to this day.

The Umtanum bighorn sheep herd was one of the first herds re-established with the release of 8 animals transplanted from the Colockum bighorn sheep herd in 1970 (Wash. State Mgmt. Plan for Bighorn Sheep 1995). The population has fluctuated between 170 and 250 animals since 1989, with an upward trend. The herd objective is 250-300 animals (2004 Bighorn Sheep Status and Trend Report), and nearly 300 were counted in the summer of 2005. Sheep from this population spend time on both the east and west sides of the Yakima River. Most of the land on the east side is in private ownership while most of the west side is public ownership. In order to keep bighorn numbers at a tolerable level for the private landowner bighorns have been removed and used for re-introductions in other areas. Habitat enhancements on the west side will hopefully induce animals to spend more time on public lands.

The original Colockum bighorn sheep herd crashed in the 1970's, and were virtually gone by 1990, most likely due to a disease outbreak, another re-introduction was initiated with releases of 43 bighorns at the mouth of Quilomene Creek between 1993 and 1996. Bighorns have now distributed themselves along the Columbia River from Malaga to the Skookumchuck drainage. The current population approximates 160 sheep (Bernatowicz, 2003) with herd objectives at 250-300 sheep. Bighorns utilize the steep cliffs, rock outcrops and talus slopes for security and the surrounding grasslands for forage along this section of the river. The threat of most concern continues to be a disease outbreak from domestic sheep, which are carriers of the disease but are not hampered by it. The USFS, Cle Elum Ranger District, has 1 domestic sheep allotment. Domestic sheep summer in the Naneum basin on mostly private land and some DNR lands. Bighorn rams are known to wander but at this point little is known if bighorns from either of these populations are coming in contact with domestic sheep.

Merriam's and Rio Grande Turkeys

Merriam's turkeys were first introduced in various areas of the region in the 1960's. Rio Grande turkeys were released in the 1980's. Turkey's with mostly Merriam's but some Rio Grande traits were released in the 1990's. The population has grown significantly with turkeys expanding into the L.T. Murray and becoming a highly sought after game bird. Current distribution is not well known for the L.T. Murray but sightings have shown flocks appearing in the eastern portion during winter periods. It is likely they are scattered throughout the area during mild weather periods as well. Some controversy surrounds the establishment of this game bird with concerns that they eat native species of invertebrates. The literature does make reference to turkeys eating insects and mollusks (Korschgen 1967) but to date no studies have been conducted on turkey diets in Washington to determine their dietary preferences or what impacts they may have on native populations of invertebrate. Turkeys are known to subsist on mast producing plants during the fall and winter months and rely on insects, forbs and succulent grasses during the spring and summer as well.

Sage Grouse

Sage grouse numbers have dramatically declined from recent history and are listed as a Washington State Threatened species. They are listed as a federal candidate species by the U.S. Fish & Wildlife Service (USFWS). Sage grouse inhabited the sage steppe communities of eastern Washington and were considered widespread but with the advent of agricultural development, overgrazing and

wildfire it is approximated over 92% of the historical habitat has been lost (Stinson, et al. 2004). The remaining populations exist in Douglas County residing on mostly private property where CRP programs have allowed habitat to recover and in Kittitas and Yakima Counties residing mostly on the U.S. Army Yakima Training Center. Although the L.T. Murray/Whiskey Dick/Quilomene Wildlife Area does not support large numbers of sage grouse, they historically occupied leks on the Møllergaard property on the Murray, and in the Hanson Pond unit of the Wenas. The birds disappeared from the Møllergaard site in the mid 1980's after the area was leveled and converted to agricultural crops. Recent conversion of this site to CRP is aimed at recovering shrub-steppe habitat. However, the loss of the open areas for leking may be a limiting factor in sage grouse returning to this site. The same thing may have occurred on the Hanson Pond unit but it was not well documented. A historical lek was documented near whiskey Dick Mountain in the 1960's with sightings of sage grouse still occurring on the Whiskey Dick/Quilomene segments to this day. The Colockum and Whiskey Dick/Quilomene are considered critical habitat linkages for the northern population in Douglas County and the southern population in Kittitas County to interchange and is the only contiguous habitat between the two sub populations. The State of Washington Greater Sage Grouse Recovery Plan (2004) identifies protecting the remaining habitat and restoring degraded habitat and re-establishing populations outside their current range as key to maintaining sage grouse populations in Washington.

Chukar

Chukar is an exotic game bird introduced in the 1930's has been very successful and are highly sought after by sportsmen throughout the western United States. Land on the eastern border of all the units support some of the best Chukar habitat in the area. Access is somewhat limiting in terms of hunting pressure during the latter portion of the hunting season particularly on the Whiskey Dick and Quilomene units. Chukar prefer deep river canyons with rocky terrain for security and water. They feed on grasses of the arid region as well as seeds, forbs, shrub fruits and insects. Weather extremes, particularly deep snow, can influence population levels (Christensen, 1996).

Forest Grouse (Blue & Ruffed)

Blue and Ruffed grouse are the more prominent grouse species on the L.T. Murray Wildlife Area, and the ones for which early season hunting affords the most opportunity. Although surveys have not been conducted to monitor populations statewide, harvest trend data suggests a decline in forest grouse populations since records have been kept in the early 1960's (Game Mgmt. Plan, 2003). Blue grouse require succulent vegetation adjacent to water sources during the breeding season, and have strong site fidelity to wintering areas (Cade 1984). They may select more mature trees for roosting (Cade and Hoffman 1990). Forbs and grasses are major food sources in the diets during summer months while fir species are primary items in the winter. Habitat management requires a mix of dense conifer stands for wintering habitat, while providing open areas for breeding and brood rearing. Logging and fire can help open stands in lower elevations and allow forbs and grasses to increase, but care should be taken not to overgraze the same area thereby reducing the amount of forage available (Rodrick & Milner, 1991).

Golden Eagle

Golden eagles are listed as a Washington State Candidate species. They require large open areas for feeding and generally nest on cliffs or in large trees (Anderson & Bruce 1980). Home range size depends on the amount of prey and prey habitat available. They use the same territory annually but may use alternate nests in different years. On the L.T. Murray there are two identified territories.

One territory has been monitored frequently and moderate success documented until recently. Disturbance has been increasing around the nest and may have caused abandonment of the site. The second site was found in 1985 but was not monitored adequately until 2004 when an active nest was found a short distance from the 1985 site. Human disturbance has resulted in access restrictions of some cliff habitats during courtship and nest-building activities. If birds are not found on these territories by the advent of incubation, these restrictions are lifted and recreational activities are allowed to resume as early as possible that year. Limiting factors can vary with regard to the success of individual sites. The main threats to golden eagles are most likely human disturbance and contaminants. Golden eagles' main prey sources are probably California ground squirrels, chukars, and big game carrion. Jackrabbits, Townsend ground squirrels, sage grouse and marmots were probably utilized historically, but are not as common today. Recreational and commercial activities adjacent to nests should be evaluated for potential disturbance and the need for restrictions to ensure nest success.



Golden Eagle

Black-tailed & White-tailed Hare (Jackrabbit)

These two jackrabbits are listed as a State Candidate species in Washington and hunting is currently not allowed. Declines in historic numbers caused concern throughout eastern Washington. The White-tailed Hare is the largest hare, weighing 6-9 pounds, and is found in shrub steppe communities of eastern Washington. The Black-tailed Hare, weighing 4-6 pounds, is thought to be a relatively recent addition to Washington, invading the state from the south around 1870 (WA-PS-154). It is found in areas with less than 10 inches of rainfall within the shrub steppe communities. They both feed on almost any green vegetation during the summer, switching to available vegetation that includes buds, twigs, and bark in the winter. Hares are preyed on by raptors and coyotes and may play a role in raptor population abundance. Both hares occur on the eastern portion of L.T. Murray Wildlife Area and throughout the Whiskey Dick/Quilomene segments. The White-tailed hare is the most prominent species on the Whiskey Dick/Quilomene segments. Maintaining the shrub steppe community is key to continued management for these species.

Shrub steppe obligates

More than 100 bird species forage and nest in sagebrush communities, and at least four of them the greater sage grouse, sage thrasher, sage sparrow and Brewer's sparrow are obligates (Braun et al. 1976). In a recent analysis of birds at risk within the interior Columbia Basin, the majority of species identified as of high management concern were shrub steppe species (Vander Haegen et al. 1999). Moreover, over half of these species have experienced long-term population declines according to the Breeding Bird Survey (BBS) (Saab and Rich 1997). Changes in land use over the past century have resulted in the loss of over half of Washington's shrub steppe habitat. Dramatic increases in dry-land agriculture and use of irrigation to expand farming and orchards has reduced the once expansive native grasslands and shrub steppe to a fragmented landscape with very few large areas of native vegetation (Dobler, F. et al, 1996). The eastern portion of the L.T. Murray and all of the Whiskey Dick/Quilomene Wildlife Area contains shrub steppe communities that support these species.

Mature/Old Forest Obligates

The L.T. Murray is situated adjacent to USFS land and contains checkerboard DNR ownership scattered throughout the project. Historically the higher elevation forested area contained older timber stands that supported old forest obligate species such as goshawk, pileated woodpecker, and likely spotted owls. The lower elevation forested area primarily contained ponderosa pine and Douglas fir that supported species such as the white-headed woodpecker. Between the 1960's through the 1990's most of the timber was harvested under a condition of sale of the property to WDFW. Spotted owls dispersing from adjacent USFS lands occasionally inhabit WDFW lands for



Male White-headed Woodpecker

short periods of time. If sufficient habitat was allowed to recover on the upper elevation timbered areas of the L.T. Murray, these birds might be able to nest there as well. Current timber management has been turned back to WDFW and the intent is to manage toward healthy conditions for each stand type. Recognizing that the majority of the stands were predominately ponderosa pine before the advent of fire suppression, any such incursion of spotted owls will be minimal and only be expected on the western edge of the wildlife area. Goshawks have nested in the vicinity of Yahne Canyon within the last 15 years but logging activity may have removed the most suitable habitat. There is a stronger likelihood of goshawks re-inhabiting the area than spotted owls since they are not as vulnerable to predation. Pileated Woodpeckers are occasionally found foraging throughout the western portion of the L.T. Murray as well. As mixed conifer timber stands mature the likelihood of these birds inhabiting the area increases.

The remaining forested areas will be managed for open ponderosa pine and Douglas fir to provide habitat for species such as the white-headed woodpecker that are dependent on large diameter, open grown trees.

2.12 Priority Species

Priority species (Table 2), which are found on the wildlife areas include: bald eagle which are primarily winter migrants; peregrine falcons have recently returned near Vantage but currently forage on Whiskey Dick and Quilomene lands and may nest on cliffs of the area in the future; prairie falcon which nest on cliffs above the Columbia River and major side canyons; northern goshawk are mature forest inhabitants and effected by timber harvest; Lewis woodpecker, loggerhead shrike feed on large insects in arid areas; As recent as the late 1980's Pronghorn antelope inhabited the arid region from West Bar to the south on the Yakima Training Center. WDFW is currently evaluating the potential to re-introduce this historically native ungulate back into Washington. (Information on priority Habitats and Species list are available at <http://wdfw.wa.gov/hab/phsvert.htm#birds>)



Peregrine Falcon

Table 2. Listed species that occur or have the potential to use the wildlife area include:

Bald Eagle	ST, FSC
Burrowing owl	SC, FSC
Ferruginous hawk	ST, FSC
Flammulated Owl	SC
Golden eagle	SC
Loggerhead shrike	SC, FSC
Northern goshawk	SC, FSC
Peregrine falcon	FSC
Pileated woodpecker	SC
Sage grouse	ST
Sage sparrow	SC
Sage thrasher	SC
Townsend's Big-Eared Bat	SC, FSC
Vaux's Swift	SC
Western bluebird	SC

State endangered (SE), State threatened (ST), State candidate for listing (SC), Federal endangered (FE), Federal candidate (FC), Federal species of concern (FSC).

Steelhead Trout

Steelhead trout are known to exist in Taneum and Manastash Creeks and their tributaries. Steelhead are listed as Threatened within the Columbia Basin Evolutionarily Significant Unit (ESU). The L.T. Murray resides within this boundary and basin wide management applies here.

The following information has been excerpted from the Yakima Sub Basin Plan (2004).

Steelhead trout were widely distributed in the Yakima basin prior to Euro-American settlement and were known to utilize virtually all of the major streams and tributaries for some aspect of their life history. It is probable that the historical spawning distribution of summer steelhead included virtually all accessible portions of Yakima Basin, with highest spawning densities occurring in complex, multi-channel reaches of the mainstem Yakima and Naches, and in third and fourth order tributaries with moderate (1-4%) gradients. The historic abundance of steelhead trout is poorly known. Howell et al., (1985) estimated that over 80,000 adult steelhead trout might return to spawn in the Yakima Sub-basin.

The current range of steelhead/rainbow trout in the Yakima Subbasin is slightly smaller than under historic conditions. Fewer tributaries are utilized for spawning and rearing than were historically. Relevant examples include Tieton River and Wenas Creek. Sections of many streams thought to formerly support spawning and rearing are now utilized only as migration corridors due to habitat degradation. When compared to other rivers with similar elevation the proportion of the steelhead/rainbow trout population that exhibits anadromy is significantly reduced. There are several theories that attempt to reconcile this difference in rates of anadromy – current environmental conditions favor residency; interbreeding with introduced resident rainbow; loss of anadromy due to reduced access caused by early operations of Roza Dam. It is also known that growth of juvenile Rainbow Trout is well below rates in similar Columbia Basin systems.

Reinforcing the hypothesis that the young of the year life stage is limiting rainbow/steelhead trout production in Upper Yakima.

Yakima Subbasin steelhead typically spend between one and three years in the ocean before returning to natal streams to spawn. Analysis of scales collected from fish captured at Prosser Dam revealed that 52% of steelhead trout spent one year in the ocean, 44% spent two years, and 3% spent three years (SBP 2001).

Key Findings for Steelhead:

- Steelhead populations have been dramatically reduced from pre-settlement abundance levels.
- Survival of steelhead kelts (mature spawned out fish with the potential to spawn again) migrating out of the Yakima Basin and through the main stem Columbia to the ocean is at or near zero.
- Capture, rehabilitation, and release of these fish in the Yakima Basin increases survival and could act as a source of broodstock/genetic material for reintroduction efforts.
- Satus and Toppenish steelhead populations are healthy.
- Production of Steelhead within the Yakima Basin is heavily weighted towards Satus and Toppenish Creeks, increasing population levels in other creeks within this AU and in other AU's will decrease risk of extinction of steelhead in the Yakima Subbasin.
- Existing and forecast future levels of abundance and straying indicate that natural colonization of suitable habitats (after removal of obstructions to passage) would be very slow or non-existent in this Assessment Unit. Supplementation into newly re-opened habitats could accelerate/greatly improve the success rate of population reestablishment.
- Growth of juvenile RBT is well below rates in similar Col. Basin systems. Reinforcing the hypothesis that the young of the year life stage is limiting rainbow/steelhead trout production in Upper Yakima.
- Anadromous in rainbow trout populations in the Upper Yakima River is presently much decreased from historic levels.

Cultural Resources

Cultural, geological, and other non-renewable resources are protected, and may not be removed unless such removal is beneficial to wildlife, habitat, or the Wildlife Area, or for scientific or educational purposes. WDFW will coordinate with the appropriate agency of jurisdiction for the protection of such resources. Past issues have included the removal of various rock formations, Native American artifacts, plants, seeds, and other items by members of the public.

CHAPTER III. MANAGEMENT OBJECTIVES, ISSUES & STRATEGIES

Statewide goals and objectives listed in Chapter One shape management priorities on wildlife areas. Specific wildlife area information including why the area was purchased, habitat conditions, species present, and public issues and concerns are evaluated to identify wildlife area activities or strategies. *Public issues from past planning efforts and the Citizens Advisory Group are noted in italics and are captured in Appendix A.*

Objectives and associated strategies or tasks specific to the L.T. Murray/Quilomene/ Whiskey Dick Wildlife Areas are listed where appropriate under applicable agency objectives. Unfunded needs are underlined.

Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats

1. Maintain big game populations

The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas were purchased to provide and protect critical winter range for deer and elk, as well as perpetuate and improve upland game bird habitat. The Quilomene and Whiskey Dick are within the range of the Colockum elk herd and provide winter habitat for elk and deer populations. The two wildlife areas also provide year-around habitat for the Quilomene bighorn sheep herd. The L.T. Murray is within the range of the Yakima elk herd and provides spring and fall transition range as well as winter habitat for elk, deer, and sheep populations. It is necessary to provide supplemental feed for the elk through the winter months at two feed sites located at Joe Watt and Robinson. Beginning in 1971, and continuing through 1976 and beyond, an elk fence was constructed to limit elk migration east of the L.T. Murray's boundary onto agricultural lands. The increasing human development onto traditional winter range had resulted in problems with elk damage to crops, hay piles, fence, and other agricultural-related structures and production. The elk fence also serves as a means of holding the elk herd in the vicinity of the winter feed sites during the winter, and limiting the stress placed on the animals by interaction with humans during a critical time of year. The combination of fencing and winter-feeding has become the necessary solution to controlling elk depredation. The Game Management Plan calls for an increase in the Colockum elk herd while maintaining the Yakima elk herd at current levels and increasing bighorn sheep populations in the Quilomene herd.

A. Strategy: Maintain the Joe Watt and Robinson feed sites to provide supplemental winter feeding for the Yakima elk herd. **Justification:** Prevent elk from moving into agricultural lands. **Timeframe:** Ongoing.

B. Strategy: Maintain the 12.5 miles of elk fence along the eastern boundary of the L.T. Murray Wildlife Area to help minimize elk damage to private properties. **Justification:** Same as above. **Timeframe:** Year around.



Joe Watt Feed Site

C. Strategy: Maintain the winter closure to public access (from start of winter feeding to May 1) on the L.T. Murray Wildlife Area. *Justification:* Prevent harassment causing elk energy loss and agricultural land damage. Timeframe: Winter.

D. Strategy: Review habitat conditions for California Bighorn Sheep, and coordinate with adjacent landowners to avoid trespass by domestic sheep and goats. *Justification:* Maintain or improve habitat for Bighorns, and prevent disease in the population.

E. Strategy: Evaluate spring time use by the public on the Quilomene and Whiskey Dick Wildlife Areas. *Justification:* To determine if public access needs to be limited during the spring to protect big game from harassment during this critical period and protect roads from unnecessary damage.

F. Strategy: Conduct weed control and seed degraded portions of the feed sites with native grasses. *Justification:* Legally required and restore native plants.

2. Improve and maintain fish populations

Steelhead, spring Chinook, and rainbow, cutthroat and bull trout are all considered important culturally, ecologically and economically to the sub-basin. These species are present (or were historically present) year-round throughout the watershed in one life stage or another. It is assumed that other aquatic life will benefit from managing toward suitable conditions for these species, due to their wide range of habitat requisites (DASP 2004). The most common limiting factors for both summer steelhead and spring Chinook are stream flow and water temperature, habitat diversity, sediment load, and quantity of key habitats for various life stages.

Taneum creek is a major drainage that flows west – east through the northern portion of the L.T. Murray Wildlife Area and supports threatened steelhead and resident trout. Manastash Creek is another major drainage that flows west to east through the southern portion of the L.T. Murray and historically supported anadromous fish. Currently, due to irrigation diversions and withdrawals, the stream is not accessible to anadromous species, but does support resident trout populations. In addition, there are numerous smaller streams that currently support resident trout populations and historically supported anadromous species (Robinson, Shadow, Cedar, Whiskey Canyon, Joe Watt, etc.) and a multitude of perennial and seasonal streams that don't support fish, but do influence downstream water quality and quantity.

The Quilomene and Whiskey Dick Wildlife Areas are bordered on the east by the Columbia River, which has documented endangered steelhead use. The larger tributaries on the wildlife areas provide fish habitat (Whiskey Dick, Jackknife, Hunt, Quilomene, and Skookumchuck) and Quilomene and Skookumchuck Creeks have documented steelhead redds in the lower portion of the drainage. Quilomene creek has perennial flow for the majority of its length, and Whiskey Dick has perennial flow up to the confluence with North Fork Whiskey Dick, but other streams on the wildlife areas are seasonal or intermittently perennial, with surface flow proximal to springs and then going underground until the surfacing again at the next spring.

- A. Strategy:** Assess fish species composition and abundance on all streams of the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. **Justification:** Needed to plan habitat improvement projects and measure success.
- B. Strategy:** Continue Road Maintenance and Abandonment Planning (RMAP) work in the Taneum and Shadow Creek areas to address sediment delivery, fish passage and other issues related to roads and fish, particularly in the case of stream adjacent roads. **Justification:** Stream adjacent roads deliver sediment to streams, limit riparian habitat and may block fish passage which are detrimental to fish. RMAP work is required by State law. Timeframe: November 2006.
- C. Strategy:** Correct known passage barriers/sedimentation issues on Quilomene and Whiskey Dick creeks. **Justification:** Passage barriers prevent re-colonization by anadromous and resident fish.
- D. Strategy:** Review roads on the Quilomene and Whiskey Dick Wildlife Areas for potential to deliver sediment and other issues relating to roads and fish. Develop a plan for addressing these issues. **Justification:** Sets priorities on road management while alleviating sediment that is detrimental to fish.
- E. Strategy:** Restore riparian habitat with shrub and tree plantings along Whiskey Dick, Cayuse, Skookumchuck, and Quilomene Creeks. **Justification:** Quality riparian habitat reduces sediment in streams, shades water and reduces temperatures.

3. Manage for upland birds

The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas were purchased to protect critical winter range for big game, as well as to perpetuate and improve upland game bird habitat. The Quilomene and Whiskey Dick Wildlife Areas are within the recovery area of the sage grouse and will be managed to provide habitat for this state-threatened species. Natural production of other upland birds on the wildlife areas are expected to continue to provide significant recreational opportunities.

- A. Strategy:** Maintain springs to provide water for upland birds and other species. **Justification:** Available water influences distribution of upland birds and other wildlife. Timeframe: Year around.
- B. Strategy:** Maintain the two guzzlers on the Møllergaard unit as required under the CRP contract. **Justification:** Condition of contract and provides water to wildlife in upland areas. Timeframe: Year around
- C. Strategy:** Field review all springs on the wildlife areas and develop maintenance or restoration plans. **Justification:** Allows systematic method and tracking of maintenance needs.
- D. Strategy:** Assess Wildlife Area management practices to ensure that grouse habitat is protected and enhanced when possible. See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6 (shrub-steppe habitat) and sub-object 7. forest habitats. **Justification:** Anticipated rejuvenation of sage grouse populations, and protection of existing population of forest and ruffed grouse.

4. Manage for species diversity

Develop and maintain quality habitat that will provide life requisites for a diversity of species. Nearly all activities on the wildlife area benefit a diversity of species.

A. Strategy: Determine species use by performing surveys for breeding birds, amphibians, or explain what general rules will apply so as not to indirectly create threats to intrinsic species. *Justification:* Prevents inadvertent detrimental impacts to species residing on the project.

B. Strategy: Determine species use and need by conducting and/or facilitating surveys of various bird, reptile, amphibian and mammal species. Cooperate with agencies and birding groups to acquire information on wildlife use of the area. *Justification:* Increase knowledge of species on the wildlife areas thereby reducing risk of inadvertent negative impacts to wildlife.

C. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 7 (Forest Habitats). *Justification:* Healthy, diverse forests support wildlife species diversity.

5. Protect and restore riparian habitat

The agency has identified riparian habitat management and protection as a priority. Riparian areas provide habitat for a large diversity of fish and wildlife species, for high densities of animals, for important breeding areas and movement corridors.

A. Strategy: Continue photo monitoring of Whiskey Dick Creek. (Photo monitoring began in 1981 when cattle grazing ended). *Justification:* To track riparian recovery. Timeframe: Spring 2008 (5-year cycle)

B. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 3. (Water Spring Review). *Justification:* Tracking status of springs.

C. Strategy: Continue to exceed Forest Practices regulations regarding riparian buffer requirements for timber harvest practices on all L.T. Murray project areas scheduled for thinning/habitat improvement treatments. Buffers will typically be between 250 and 400 feet. *Justification:* Reduce sediment delivery to creeks and protect riparian zones. Allows case-by-case habitat protection. Timeframe: Implement projects as they occur.

D. Strategy: Place barriers in primitive camping areas along Taneum Creek to limit access by vehicles to wildlife trees and riparian habitat. Other riparian areas on the L.T. Murray will be examined as well for needed restrictions on camping areas that are stream adjacent. Robinson and Joe Watt are prime examples of the continued encroachment of camps toward the stream corridor (particularly during general deer and elk seasons). *Justification:* To protect wildlife trees and riparian habitat.

E. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 2. *Justification:* Pro-active riparian protection.

6. Protect and restore shrub steppe habitat

The agency has identified shrub-steppe habitat management and protection as a priority. Shrub steppe areas provide habitat for a diversity of fish and wildlife species and for comparatively high densities of animals. Shrub steppe is also very vulnerable to habitat conversion and alteration practices.

A. Strategy: Perform shrub steppe condition surveys to assess habitat quality issues. *Justification:* Data is needed to monitor changes and trends, identify degraded areas and measure success of improvement activities. Also helps determine wildlife species use for each habitat type.

B. Strategy: Evaluate use of prescribed fire to rejuvenate and improve shrub-steppe habitat and reduce the risk of catastrophic fires. *Justification:* History of fire suppression may have negatively altered habitat conditions. Before fire is used current data and research should be considered.

C. Strategy: Assess Møllergaard unit CRP fields that are currently in non-native grass stands for restoration to native grasses and forbs. Coordinate assessment with Lessee, FSA and NRCS. *Justification:* To bring restoration to completion while increasing plant diversity and quality of habitat. Timeframe: 2006-2007.

D. Strategy: Continue to implement weed control through native grass seedings (goal: 20 acres). *Justification:* Established healthy native plant communities can prevent weed invasion. Timeframe: Annually, Fall.

E. Strategy: Continue restoration efforts at Hell's Kitchen area of Whiskey Dick Wildlife Area. Weed control and inter-seeding with additional native grass species is anticipated to be necessary. *Justification:* Restore native plant communities that support native wildlife. Timeframe: Annually-Late spring through fall.

7. Protect and restore forest habitats

The agency has prioritized mature forest habitat management and protection. Mature forests support high wildlife populations and species diversity, and are important as wildlife breeding and seasonal use habitats. Many forest stands on the Wildlife Area are unhealthy due to overstocking, over-harvest, insects and diseases. Restoration is needed to move these stands towards a more mature, diverse, healthy condition.

A. Strategy: Conduct understory

thinning and prescribed burns on 800 acres in the Robinson watershed to reduce risk of catastrophic fire, insect and disease potential, and create forest conditions that more closely replicate the historic range of variability (HRV) suitable for a diversity of historic wildlife species. *Justification:* Reduces fuel load and stimulates fire dependant forage species preferred by ungulates and other early successional wildlife species. Timeframe: 2007-2008.

B. Strategy: Conduct prescribed burns on up to 500 acres of thinned timber stands in the Joe Watt and Rattlesnake drainages that were thinned in 2003 and 2004 to reduce risk of catastrophic fire, insect and disease potential and create forest conditions more suitable to a diversity of species. *Justification:* Same as above.

C. Strategy: Assess remaining low elevation timbered stands on the L.T. Murray for understory thinning and prescribed burning need and potential to reduce risk of catastrophic fire, insect and disease potential and create forest conditions more suitable to a diversity of species. *Justification:* Same as above.



Understory Thinning at Joe Watt using a Feller Processor

D. Strategy: Monitor timber thinning operations and subsequent prescribed burning to evaluate vegetative response. *Justification:* Same as above. Timeframe: Ongoing.

8. Protect and manage other species

Develop and maintain quality habitat that will provide life requisites for a diversity of species. Nearly all activities on the wildlife area benefit a diversity of species.

A. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 2, addressing priority fish species. *Justification:* Improves habitat conditions necessary for fish species.

B. Strategy: Maintain high quality shrub-steppe, forest, and riparian habitat conditions to enhance obligate species protection. *Justification:* Supports high wildlife species diversity and reduces weed intrusions. Timeframe: Ongoing.

C. Strategy: Protect and preserve sensitive wildlife sites such as active sage grouse lek sites, active golden eagle and peregrine falcon nests, big horn sheep lambing areas and big game wintering areas from human disturbance. *Justification:* Human intrusion by any means, including foot, bicycle, and horse or motorized, increases stress and reduces survival of sensitive wildlife. Timeframe: Ongoing.

D. Strategy: Protect nesting and foraging habitat for woodpecker species. Protect snags and wildlife trees. Many cavity nesting forest birds depend on the primary cavity excavators to provide nesting and roosting cavities. Species such as the white headed woodpecker require large diameter snags and trees for foraging and nesting. *Justification:* Snags and large diameter trees have been eliminated from many forest stands during logging operations and are becoming scarce. Timeframe: Ongoing.

E. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 7. Protect and create snags in association with timber thinning projects. *Justification:* Limited number of snags, suitable nest sites. Timeframe: Implement as projects occur.

F. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 7. Understory thinning and prescribed burning of overstocked stands will reduce competition and release remaining trees (primarily ponderosa pine), setting stands on a trajectory to produce large diameter ponderosa pine habitat. *Justification:* Reduces disease and fuels allowing for healthier forest stands with larger diameter trees, lower density stands, and greater wildlife use.

G. Strategy: Maintain and expand nest box placement on all units. *Justification:* Limited cavity nest sites for passerine cavity nesters.

Agency Objective: Provide Sustainable Fish and Wildlife-Related Recreational and Commercial Opportunities Compatible With Maintaining Healthy Fish and Wildlife Populations and Habitats. Improve the Economic Well-Being of Washington by Providing Diverse, High Quality Recreational and Commercial Opportunities.

1. Provide public access compatible with fish, wildlife and habitat protection.

Access for hunting, fishing, wildlife viewing and other activities is an agency priority. However, access and recreation must be controlled to protect fish and wildlife resources and to comply with federal and state regulations. *Public input clearly emphasizes the importance of providing recreational access with protections for the resource.*

A. Strategy: Use the Cooperative Green Dot Road Management System to provide open roads on WDFW ownership where no resource issues exist and when there are sufficient resources to maintain them. Address requirements in Road Management and Abandonment Plans. *Justification:* Provides public access and provides management consistency. Timeframe: Ongoing.

B. Strategy: Close road access, either seasonally or permanently, where road conditions are not safe or where conditions have a significant negative impact on fish and wildlife. *Justification:* Increase safety and reduce habitat and species impacts. Timeframe: Year around.

C. Strategy: Continue to implement the L.T. Murray Road Management and Abandonment Plan as required by Forest Practices regulations. *Justification:* Legally mandated and provides resource protection. Timeframe: Through 2015.

D. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 8, (Protect sensitive wildlife sites). *Justification:* Disturbance detrimental to sensitive species.

E. Strategy: Provide limited, primitive camping where no resource issues exist. Dispersed camping is allowed throughout the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. In addition, vehicle camping is only allowed within 100 feet of open, green dot roads unless otherwise posted. Camping is limited to 14 days within a 60 day period on all WDFW owned or managed lands within Yakima and Kittitas Counties. Limit is extended to 30 days in a 60-day period from September 1 through November 30. No permanent camps or structures are allowed. Woodcutting is not allowed on WDFW ownership. *Justification:* Legally mandated and provides resource protection. Public users are liable at all times for their campfires. Timeframe: Year around.

F. Strategy: Provide hunting opportunities for persons with disabilities. The North Riggs Canyon road, a non-green dot road, is currently available by permit during the general deer and elk seasons to disabled hunters for motorized travel. *Justification:* Provide reasonable access to increase opportunities for the disabled. Timeframe: Seasonally.

G. Strategy: Develop GIS layers of all resources, roads, trails, parking and camping areas, and other facilities available to the public. *Justification:* Improves management efficiency and aids the public.

H. Strategy: Develop a GIS-based Green Dot Road Management map for distribution to the public. *Justification:* Improves management efficiency and aids the public.

I. Strategy: Assess the impacts of target shooting on the wildlife area to fish and wildlife and their habitat. *Justification:* To evaluate whether or not there is a need for more control of target shooting and the litter and damage associated with it.

2. Provide commercial opportunities compatible with fish, wildlife and habitat protection.

Consider commercial activities on the wildlife area when benefits to fish, wildlife, and their habitats outweigh the impacts or when mandated by state law.

A. Strategy: Ensure proper implementation of the Puget Sound Energy (PSE) lease agreement that authorizes the placement of wind towers in Section 35 of the Whiskey Dick Wildlife Area as part of the Wildhorse Windpower Development

project. *Justification*: Provides funding for the Whiskey Dick Wildlife Area in an already impacted area. Timeframe: Ongoing.

B. Strategy: Coordinate with PSE to ensure that impacts to fish and wildlife resources are minimized on the Whiskey Dick Wildlife Area during construction and subsequent operations. *Justification*: Cooperative resource protection agreed on by PSE. Timeframe: Ongoing, Fall 2006.

C. Strategy: Develop an access agreement with Puget Sound Energy (PSE) on the Wildhorse Windpower Development to ensure that public access to state-owned lands is maintained. *Justification*: To provide public access to state-owned lands where compatible with both the ongoing project work and habitat protection, and to ensure compatibility with the Green Dot Road Management System.

Agency Objective: Minimize Adverse Interactions between Humans and Wildlife.

1. Provide refuge areas for wildlife and reduce winter disturbance.

Human activity on the wildlife areas can displace wildlife populations. If this activity is determined to be detrimental, areas are posted to limit public entry. Winter disturbance is especially critical because of the higher energy requirements needed by wildlife during severe weather.

A. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 1, (winter closures and monitor public use).

Justification: Reduce body energy loss to wildlife.

B. Strategy: See Agency Objective: Provide Sustainable Fish and Wildlife-Related Recreational and Commercial Opportunities Compatible With Maintaining Healthy Fish and Wildlife Populations and Habitats. Improve the Economic Well-Being of Washington by Providing Diverse, High Quality Recreational and Commercial Opportunities. Sub-objective 1, (green dot road Mgmt). *Justification*: Reduce disturbance to wildlife.

2. Implement strategies to reduce elk damage on private lands

The agency owns, maintains and manages a large land base to provide habitat requisites for wildlife populations. Additional strategies such as supplemental elk feeding, fencing, and herding are implemented to reduce elk damage to crops on adjacent private lands.

The wildlife area has a high concentration of big game on winter range that must forage on early spring grasses to replenish their energy levels. Human disturbance can move these animals off the wildlife areas and onto private lands, causing damage to crops and range pastures.

A. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 1(winter closures and monitor public use).

Justification: Reduce disturbance and energy loss to wildlife on public lands.

B. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 7, (forest habitats). *Justification*: Improve habitat on public lands.

C. Strategy: See Agency Objective: Provide Sustainable Fish and Wildlife-Related Recreational and Commercial Opportunities Compatible With Maintaining Healthy Fish and Wildlife Populations and Habitats. Improve the Economic Well-Being of Washington by Providing Diverse, High Quality Recreational and Commercial

Opportunities. Sub-objective 1, (green dot road mgmt.). *Justification:* Reduce wildlife disturbance on public lands.

Agency Objective: Ensure WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats

1. Manage weeds consistent with state and county rules and to protect and recover fish and wildlife and their habitats

Weed control is required by state law to protect public economic and natural resources.

Invasive weeds are one of the greatest threats to fish and wildlife habitat quality.

Cooperative weed efforts are encouraged to improve efficacy and to minimize impacts on adjacent landowners as part of the agencies good-neighbor priority.

Weed control on the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas has been an increasingly successful endeavor with the recent increase in funding, improvements to spray equipment, use of GPS data for locating new sites and relocating past areas of treatment, the release of biological control species, and cooperative efforts with Kittitas County Weed Board.

A. Strategy: Produce and implement an integrated weed management plan (**Appendix 2**) to include weed identification and inventory, risk/threat, control priorities, and monitoring. *Justification:* Increase weed control efficiency. Timeframe: Ongoing.

B. Strategy: Coordinate weed efforts with federal, state and local entities to improve efficacy and minimize costs. *Justification:* Improve efficacy and minimize costs. Timeframe: Annually.

C. Strategy: Continue to use Integrated Pest Management strategies, including biological control, chemicals, mechanical and cultural methods, to control invasive weeds. *Justification:* More effective and environmentally responsible weed control. Timeframe: Ongoing.

D. Strategy: Continue to control weeds along all roads on the wildlife areas. 65 to 80 miles of roads per year are expected to be treated to reduce the spread of noxious weeds. *Justification:* Roads are in a chronically disturbed state making them more susceptible to weed invasion; also vehicles transport weeds. Timeframe: Ongoing, Spring/Fall.

E. Strategy: Continue to electronically map weed locations. Invest in new data collectors and software to improve the efficiency of the wildlife areas noxious weed control program. *Justification:* Improve noxious weed control efficiency, and reduce soil and habitat disturbance. Make data collection, record keeping, reporting, and monitoring all easier, as well as improving the interface capabilities (database to GIS) for map production.

F. Strategy: Complete a comprehensive inventory of the wildlife areas for invasive noxious weeds. *Justification:* Due to the large size of the wildlife areas, a complete field review of the acreage has never occurred. Knowing the location of all existing invasive weeds will allow us to catch infestations while they are small, reducing habitat disturbance and improving weed control efficiency. This would allow for dovetailing into a larger mapping effort in the future by adjacent landowners as well.

2. Manage species and habitat in compliance with the Endangered Species Act and Washington State fish passage, road management and forest practice rules.

Federal law requires the protection and management of threatened and endangered species. State law requires fish passage and screening issues and forest road sedimentation issues to be addressed on state lands. Forest thinning operations on agency lands must follow state forest practice law.

A. Strategy: Protect buffers adjacent to wetlands and riparian habitat. *Justification:* Wetlands and riparian zones support unique, priority habitats and species. This reduces sedimentation & keeps water cooler. *Timeframe:* Ongoing.

B. Strategy: Develop specific strategies associated with ESA species present or potential. *Justification:* Reduce inadvertent negative impacts to ESA species while increasing management efficiency.

C. Strategy: Implement the L.T. Murray forest Road Management and Abandonment Plan. *Justification:* Legally required and provides sedimentation control. *Timeframe:* Through 2015.

D. Strategy: See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 2, (fish passage and sedimentation).

Justification: Legally required.

E. Strategy: Map all ESA species and their habitats on the wildlife areas and develop GIS layers depicting the location and species. *Justification:* Increases management efficiency and effectiveness of ESA species.

F. Strategy: Develop specific management practices associated with ESA species present or likely present. *Justification:* Reduce inadvertent negative impacts to ESA species while increasing management efficiency.

3. Provide fire management on agency lands (Appendix 3)

Fire suppression agreements must exist for all agency lands to protect the people of Washington and to protect natural and economic resources of the agency and adjacent landowners.

A. Strategy: Enter into contracts/agreements with local, state or federal entities to provide fire suppression support on the Quilomene and Whiskey Dick Wildlife Areas. The L.T. Murray is within the State Fire Protection Boundary where WDNR is responsible for all fire suppression. *Justification:* DNR & USFS have firefighting equipment and personnel to control catastrophic unplanned wildfires. *Timeframe:* Annually.

B. Strategy: Provide red card fire training for wildlife area manager and assistant manager. Provide blue card fire training for remaining staff. *Justification:* Increases safety of staff. *Timeframe:* Annually.

C. Strategy: Coordinate with fire-fighting entities. Maintain list of fire responsible individuals. *Justification:* Improves efficiency of response. *Timeframe:* Annually.

D. Strategy: Provide an on-site liaison to fire-fighting entities when a wildfire occurs on the wildlife areas. *Justification:* Improves efficiency of response, provides guidance on Agency priorities. *Timeframe:* Seasonally.

4. Protect cultural resources consistent with state and federal law

Federal and state law requires an assessment of cultural resources on agency lands prior to activities that may impact those resources.

A. Strategy: Assess cultural resource value (historic and archaeological) of all structures before renovation or removal. *Justification:* Prevents inadvertent loss of culturally important structures.

B. Strategy: Perform cultural resource survey and assessment before excavation or soil disturbance - including posts for new fence line, parking lots, toilets, buildings, new and old agricultural fields, seeding, timber management, etc. *Justification:* Required by State and or Federal law.

C. Strategy: Consultation require prior to the RC Understory. Timeframe: 2006-2007.

5. Pay county PILT (Payment in lieu of taxes) and assessment obligations

State law requires the agency to pay PILT and county assessments.

A. Strategy: Pay PILT and assessments to counties. *Justification:* State law requires the agency to pay PILT and county assessments. Timeframe: Annually, April 15th.

Agency Objective: Reconnect with Those Interested in Washington's Fish and Wildlife

The knowledge and experience of visitors to the wildlife area could be enhanced regarding fish and wildlife habitat management by providing onsite interpretive signs explaining management activities and public use.

Educate the public regarding public access and other regulations through green dot reader boards, other signage, and news releases. Issues include road management system, camping, fires, firewood cutting, permanent structures, mineral extraction, etc.

1. Participate in local cooperative groups

Participating in local groups ensures that issues on or adjacent to the wildlife areas are being identified and addressed in a cooperative manner involving the public, our users, and our neighbors.

A. Strategy: Continue to participate in the Big Game Management Roundtable (BGMR). *Justification:* Maintains communication and coordination with public and landowners. Timeframe: Ongoing.

B. Strategy: Attend and participate in CRM meetings that involve grazing permits adjacent to the L.T. Murray/ Quilomene/Whiskey Dick Wildlife Areas that could impact management on the wildlife areas. *Justification:* Increases management efficiency and coordination between entities involve. Timeframe: Ongoing.

2. Involve the public in projects on the wildlife areas

Volunteers provide a valuable source of labor and knowledge for various projects on the Wildlife Area. Minimal staffing limits what the Agency staff can accomplish.

A. Strategy: Provide, as available, projects for Advanced Hunter Education (AHE) participants to complete their community service requirement. *Justification:* Assist in hunter education while accomplishing needed tasks. Timeframe: Ongoing.

B. Strategy: Coordinate with local user groups on Wildlife Area clean-up projects. *Justification:* Assistance for Wildlife Area staff in accomplishing desired projects and increasing public awareness. Timeframe: Ongoing, April.

C. Strategy: Solicit help from local conservation groups and clubs on habitat enhancement projects. *Justification:* Same as above. Timeframe: Ongoing.

Agency Objective: Provide Sound Operational Management of WDFW Lands, Facilities and Access Sites

1. Maintain facilities to achieve safe, efficient and effective management of the wildlife area

A. Strategy: Maintain office to provide a safe and effective workplace. Provide utilities, phone, computers, etc. *Justification:* Efficient operation of the Wildlife Area requires maintenance of a functional headquarters. Timeframe: Ongoing.

B. Strategy: Maintain all fences to reduce big game damage issues and to prevent trespass livestock, thereby protecting habitat. Survey entire elk fence in early spring and late fall each year. Survey boundary stock fence, prioritizing based on sections that will have livestock on adjacent ownerships. *Justification:* Excludes trespass livestock and minimizes potential for elk damage on private land.

C. Strategy: Survey ownership and build new stock fence on the surveyed boundary of the L.T. Murray with the Brain property (T18N, R16E, section 1) to resolve property boundary dispute and protect against trespass livestock. *Justification:* Cleans up property lines, excludes trespass livestock, and prevents development trespass.

D. Strategy: Assess the need for livestock fencing and remove all un-needed fences particularly where they are a hazard and/or barrier for humans and wildlife. *Justification:* Reduces wildlife barriers and entanglements.

E. Strategy: Maintain roads to prevent resource damage and provide access. Upper Hutchins, Shadow Creek and Tamarack Ridge roads need to be graded and portions rocked. Assess Quilomene/Whiskey Dick roads to prioritize maintenance needs. *Justification:* Maintains public access and prevents resource damage.

F. Strategy: Maintain all signs and reader boards. Maintain parking areas to prevent resource damage and provide access. *Justification:* Allows management of public use and controls vehicle travel. Timeframe: Ongoing.

G. Strategy: Using the Region Three Facility/Building Inventory Assessment, identify the five highest priority structures that need to be addressed based on safety issues. Work with engineering staff to schedule and complete work. Engineering should include a cultural resource assessment for historic structures. Surplus any materials/structures to generate revenue prior to demolition or removal.

Justification: Provides a systematic approach to ensure structures are safe to operate in and around.

H. Strategy: Provide a Headquarters facility for the L.T.

Murray/Quilomene/Whiskey Dick Wildlife Areas. *Justification:* Current location at the Ellensburg District Office does not provide sufficient space or needed resources (Staff has been forced to fill herbicide spray tanks and rinsing chemical containers at their homes). There is no shop and repair space, and far less storage than is needed for accessibility to tools and equipment. Parking is limited, and storage and parking are not secure with regard to proper handling of pesticides and potential vandalism or theft of expensive tools and equipment.

2. Maintain other structures and physical improvements

A. Strategy: Maintain all signs, gates, culverts, water structures, wells, irrigation systems. *Justification:* Required for efficient operation of Wildlife Areas. Timeframe: Ongoing.

B. Strategy: Replace/install boundary and unit signs as needed. *Justification:* Allows public to identify property. *Timeframe:* Ongoing.

3. Maintain equipment

A. Strategy: Service all equipment including trucks, tractor and implements, weed sprayers, trailers, etc. Request replacement equipment when needed. *Justification:* Increases service life of equipment, reduces down time. *Timeframe:* Ongoing.

B. Strategy: Rent equipment when it is more efficient to do so or when needed. *Justification:* More cost effective.

4. Pursue funding opportunities

A. Strategy: Apply for grants and other funding opportunities consistent with planned priorities to supplement funding. *Justification:* Supplements limited budgets. *Timeframe:* Ongoing.

B. Strategy: Investigate whether Wildlife Area rangelands would meet the requirements of SRP. Where applicable, enroll lands in CRP, SRP and other federal programs to generate revenue and accomplish desired habitat conditions.

Justification: Improves habitat, reduces erosion and weeds, supplements budgets. *Timeframe:* Spring 2007.

5. Assess forest conditions with regard to catastrophic fire, insect and disease risks

The history of fire suppression in many cases has resulted in forest tree densities far greater than historic levels. Dense forest stands may create fire hazards for humans and wildlife and increase the risk of detrimental forest insects and disease reaching catastrophic levels.

A. Strategy: Assess/implement timber-thinning projects to reduce potential insect and fire danger and create forest conditions more suitable to a diversity of species (See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 7. *Justification:* Responsible forest management.

6. Perform administrative responsibilities

A. Strategy: Develop and monitor budgets. *Justification:* Determines outcomes. *Timeframe:* Ongoing.

B. Strategy: Supervise employees. *Justification:* Legally required. *Timeframe:* Ongoing.

C. Strategy: Write reports. *Justification:* Agency required. *Timeframe:* Ongoing.

D. Strategy: Coordinate and work with adjacent landowner to develop and share mutual objectives.

E. Strategy: Provides consistent management. *Timeframe:* Ongoing.

F. Strategy: See Agency Objective: Reconnect with Those Interested in Washington's Fish and Wildlife. Sub-objective 1. (Attend and participate in CRM meetings). *Justification:* Management actions addressed.

G. Strategy: See Agency Objective: Reconnect with Those Interested in Washington's Fish and Wildlife. Sub-objective 1, (Attend Big Game Management Roundtable (BGMR) meetings). *Justification:* Enhances communications on resolving issues.

H. Strategy: Work with staff to ensure high morale and job satisfaction. Promote self-motivation and good work ethics. *Justification:* General part of supervision. Timeframe: Ongoing.

I. Strategy: Supervise contractors, lessees, permittees, volunteers, Washington Conservation Corps employees, other WDFW personnel, and public and private organizations on the wildlife areas. *Justification:* Ensures compliance of work. Timeframe: Ongoing.

K. Strategy: Write, update and implement wildlife area management plan, weed control plan and fire control plan. *Justification:* Agency policy and assists in systematic approach to management and control. Timeframe: Completed all plans in 2005. Ongoing.

L. Strategy: Conduct wildlife and habitat surveys. Identify and prioritize information and survey needs. *Justification:* Determine status of wildlife and habitat conditions for management options.

M. Strategy: Manage an extensive equipment inventory used for habitat maintenance, enhancement, restoration and preservation. *Justification:* Ensures successful operation.

N. Strategy: Plan for and purchase supplies, tools and equipment. *Justification:* Part of administrating the Wildlife Area.

O. Strategy: Attend meetings and meet with private individuals and agency representatives as needed. *Justification:* Resolve issues, coordinate activities and act as agent of the agency. Timeframe: Ongoing.

P. Strategy: Evaluate performance measures and produce an annual performance report. *Justification:* Monitor success in completing yearly management objectives.

Q. Strategy: Meet with Citizens Advisory Group at least once a year. *Justification:* Address issues on the Wildlife Area.

7. Maintain a knowledgeable and well-trained work force

A. Strategy: Provide red or blue card training for wildlife area staff. *Justification:* Increases safety of staff and required to be on site during fire suppression. Timeframe: Annually.

B. Strategy: Send staff with public applicator licenses to recertification workshops. *Justification:* Legally required. Timeframe: Annually.

C. Strategy: Provide staff with first aid training. *Justification:* Agency policy. Timeframe: Annually.

8. Protect and apply water rights for best use

Water rights can impact Wildlife Area operations including food plots, restoration projects, etc. Water use can also reduce instream volumes for fish and other animals.

A. Strategy: Identify and record all water rights and uses of water. *Justification:* Determines management options. Timeframe: Completed 2005 (**Appendix 4**).

B. Strategy: Move all unneeded water rights permanently or temporarily into the State Trust Water Rights Program. *Justification:* Better use of water resources. Timeframe: Ongoing.

CHAPTER IV. PERFORMANCE MEASURES, EVALUATION AND UPDATES TO THE L.T. MURRAY/QUILOMENE/WHISKEY DICK WILDLIFE AREAS PLAN

Wildlife Area plan performance measures are listed below. Accomplishments and desired outcomes will be monitored and evaluated to produce an annual performance report. The Wildlife Area plan is a working document that will evolve as habitat and species conditions change, as new regulations are enacted, and as public issues and concerns change. Plan updates will address these changes.

1. The L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas performance measures for 2006 include:

- 12.5 miles of elk fence maintained on the L.T. Murray to reduce elk damage claims.
- 7 miles of stream opened by removing man-made barriers.
- 5 corrective road projects completed as part of RMAP.
- 4 fish passage projects completed.
- Guzzlers on the Møllergaard unit maintained.
- 20 acres of degraded shrub-steppe habitat planted with native species.
- 200 acres of weeds treated, with an additional 65 miles of weed treated adjacent to roads.
- Fire contracts in place for wildlife area protection.
- Red or blue card training completed by wildlife area staff.
- Plans completed including Wildlife Area Plan, weed plan, fire plan, and annual RMAP report.
- Contact with CAG maintained (at least one meeting per year).
- Staff attended annual pesticide recertification workshops.
- First aid training provided to staff.

APPENDIX 1: PUBLIC ISSUES/CONCERNS

The purpose of meeting with the CAG and DT was to obtain input to help guide management actions on the wildlife area. A draft of the introduction and history of the wildlife area and copies of the Agency's goals and objectives were distributed for review and discussion. Below is a list of issues and concerns identified by the CAG and DT. This input will assist in developing strategies to implement management goals and objectives. Underlined statements below indicate that the input was received from the DT.

Issue A: Weed Management

- Develop posters on noxious weeds, post interpretative signage, and use other means to educate users on weed species, ways weeds are spread, and generally what to watch out for.
- Good progress being made, work with County Weed Boards.
- Should raise fines for illegal off-road travel as a way of financing some outreach and education.
- Begin educating with kids in school, just like Hunter Ed. Raise conservation awareness at an early age.
- Include something in the hunting/fishing pamphlets on weeds (and on the DFW Website).
- Hit on user groups for help in outreach and projects.
- Many noxious weeds are spread by both domestic and wild animals.
- Weed spread by vehicle travel; focus on the roads first.
- Prepare an integrated weed management plan.
- Current and future use of bio-controls an important component.
- Comment reinforcing the need for re-vegetation efforts once weeds are under control, and encouraging more of that work.
- Re-vegetation agreed to be a priority to improve habitat that has deteriorated as a result of weed infestation. Some commented that native over non-native is good if the native species are hearty and aggressive enough to compete and establish, but felt that sometimes non-native species are quicker to establish.
- Question asked if WDFW receives much public input and identification of problem areas by users of the Wildlife Areas. Response was that input by users has been an important way of identifying weed infestations, particularly in the more remote areas that staff doesn't see regularly.
- Discussion followed with the consensus being that WDFW needs more education and interpretive signage and literature to help users know what species are weeds, how they are spread, and how they can be controlled.
- New seed mixes are being made available to the general public that are marketed as being attractive plants to wildlife. Many contain noxious weed seed in the mix.

Issue B: Recreation/Access

- Need more signage and education on littering.
- Limit camping to a maximum of 14 days within a 60-day period (during general hunting seasons, 21 days within a 60-day period).
- Acquire fee title or easements on key inholdings to maintain public access.
 - o Need increased enforcement on the wildlife areas.

- o -Off road vehicles, mudders, hill climbs, campfires, target shooting (safety issue), littering, damage to elk fence.
 - o Find new, more effective methods such as aerial reconnaissance; tell public how to report a violation (give them a phone number).
 - o Use annual report form enforcement to help focus efforts.
- Educate the public regarding public access and other regulations through green dot reader boards, other signage, and news releases. Issues include road management system, camping, fires, firewood cutting, permanent structures, mineral extraction, etc.
- Inventory public use of the areas using standard, consistent methods, such as vehicle counters.
 - o Use monitoring to focus efforts; determine objectives for monitoring.
 - o Identify key areas of public use.
 - o Consider how to use local knowledge.
- **Winter Range Protection:**
 - o If areas need to be closed seasonally to protect elk, then WDFW should do it.
 - o Regulate public access in big game wintering areas. Seasonally close roads, snowmobile use etc.
 - o Too many elk are being pressured (particularly in late winter/early spring) by 4-wheelers and other ATVs. Example: Bruton Road on Colockum Wildlife Area. How do we change that, enforce it, and improve the situation for elk?
 - o Comment that the degree to which a seasonal closure or restriction is needed has to be established. DFW must quantify it somehow to prove undue pressure on the animals (monitor the elk traffic for example). Enforcement is key, and tough to carry off. Also, is it mostly activity that is already illegal that is most of the problem?
 - o Comment that this relates directly to elk depredation in the Kittitas Valley, and can mean weighing recreational opportunity (legal or not) against economic loss to the agricultural community.
 - o Discussion on closure options; vehicle closure only versus closure to access of any kind.
 - o Other factors to consider that relate to private ownership. Example of the Skookumchuck, which is an area that lies directly between the Quilomene and Whiskey Dick Wildlife Areas. This renders all three hard to control and enforce.
 - o Suggestion that one place to start with the Quilomene, Whiskey Dick, and Colockum would be to post signs and notify to block approach by water.
 - o Consensus that, public outreach is needed to help fight mudding and other illegal practices like chasing elk.
 - o Comment that USFS regulations vs. DFW, County, other State, etc. can be a problem, particularly with ATVs (different regulations are confusing).
 - o Four-wheel clubs want to get involved in advocating legal use of the resources, and there is a need to reach out to them.
- **Road Management:**
 - o Most users on roads are hunters paying for licenses; they expect and deserve access.
 - o Numerous hunters (he said most) want fewer roads to improve hunting and reduce the number of lazy road hunters.

- o Need for more Enforcement presence on the wildlife areas. “You whack a few bad apples, and the word gets around.” More flights to check for off road use!
 - o Put up a reward of some sort for turning offenders in, like the points thing for hunters who do so.
 - o Limit access to permit only.
 - o Consider more road improvements on the roads we want the folks using (“harden the good roads”), to reduce illegal use of others and off-road infractions. Channel the people where we want them with road management and fence.
 - o Would hate to see the WAs become too restricted.
 - o Conduct more surveillance by staff or hidden camera at problem spots; also more gates in key places.
 - o Get volunteers (jeep club members and others) to work on some key spots (machinery and hand work) and routes. DFW staff needs do outreach for help.
 - o WDFW should charge for Green Dot maps.
 - o Solid data and evidence of resource damage, etc. is needed to back up decisions for closure.
 - o Spend time with staff outlining things they need to document regularly when in the field. Get some data on paper, informal or not.
 - o DFW shouldn’t worry so much about pleasing everyone, just do what is right. Only 10% gripe about what DFW does for wildlife and habitat anyway.
 - o Closing road A may only mean more traffic for road B, and that always needs to be a consideration.
 - o Need to consider more seasonal closures and gates as an alternative to abandoning roads. Many people want to see the majority of roads remain open for travel when it is not a resource issue. Closing roads can also limit access for fire suppression.
 - o Need more signage and education to explain road management practices.
 - o Include rules and information with the new ATV paperwork at dealerships, educate to tread lightly, establish and enforce speed limits. Provide info in the hunting and fishing pamphlets.
 - o Work with Forest Service to resolve differences in green dot versus green diamond road management.
 - o Maintain/close roads to prevent impacts to water quality.
 - o Green dot is a good road management system for the type of open country that we are dealing with.
 - o When closing roads, use physical barriers where and when they can be effective.
- **Fences/Gates:**
 - o Maintain the elk fence.
 - o Firm statement that there are enough public access locations already in place. Agreement that only more problems would result if new access points were established.
- **Target Shooting:**
 - o More signage and information needed on the sites where target shooting occurs to reduce littering and use of inappropriate targets (glass, tv’s, washers/dryers).

- o Consensus that there is a need for more enforcement presence by DFW and by County Deputies. Someone expressed the feeling that there is sometimes a climate of fear over who is out there shooting auto and semi-auto firearms.
- o No laws that restrict shooting on the wildlife areas, but safety issues, particularly at Sheep Company shooting area on the Wenas Wildlife Area, are real.
- o Look at creating backstops, formal ranges, or shooting restrictions.
- o Need an assessment of activity at Sheep Company shooting area on the Wenas Wildlife Area before permanent solutions can be proposed. May need to be manned by volunteers to watch people and take license plate numbers to help address the safety and littering issues.
- o Question as to whether or not it boiled down to designating only certain areas for shooting and or imposing sanctions for use other than what is acceptable? John responded that if we provide the place and promote the use in any fashion, it increases the liability for DFW. Dumpsters were suggested, so that people can dump their shooting trash (apparently done in Montana). The managers agreed that more than shooting trash would soon be dumped there.
- o CAG consensus suggested more outreach, and communication that the litter associated with these shooting areas is unacceptable. DFW needs to publicize, inform, and make people aware.

Issue C: Grazing

- Consensus that many riparian areas and degraded habitat should not be grazed, but recommended the agency use it as a tool where needed (with very strict controls imposed on it).
- Consensus that grazing could be a good management tool, when used within strict guidelines for movement and rotation of stock. Timing is an essential component with regard to when land is grazed, and for how long.
- Generally the impact of spring grazing heavier than with fall grazing.
- DFW needs to work with DNR and other agencies to control cattle grazing better, with riders, etc, and focus on protection of riparian and sensitive areas; require riders and or fencing to keep moves/rotations of cattle on track. Need better assessment tools, and strict time frames that are enforced.
- Some would like to see more grazing tried on DFW lands. Some felt that it fits as an enhancement to grazing on private lands, can be of economic benefit, and also work to enhance habitat. Can be good for sage grouse habitat.
- Do the managers decide whether or not it is appropriate to try?
- Comment that it can be bad PR to discourage grazing, and limits revenue generated by the agency.
- Stressed that grazing needed strict planning and control, and there are contractors who do that sort of thing (like Solar Dollars).
- The Tarpiscan snafu was mentioned, and the access that had been gated by a private individual as a result. Some felt that was a lost opportunity to cooperate with an adjacent landowner in good grazing practices, and the public lost an access to the Colockum Wildlife Area in the process.

Issue D: Fire Management

- Use media coverage to explain the reasons and justifications for prescribed burning.

- Need to be more consistent on implementation of campfire restrictions.
- Develop a fire plan. Treat fire (wild and prescribed) as an integral part of grassland and shrub land management. Recognize that fire is difficult to exclude.
- Question about existing contracts for fire districts or DNR to fight or control fires for WDFW.
- Discussion followed relative to liability in wildfire situations, the need for more adjacent landowner cooperation (whether public or private), and what success, or not, that WDFW has had with prescribed burning. The managers explained that it was pretty new for us other than on very small scale, and that the L.T. Murray work would be the first larger burn done in decades.

Issue E: Wildlife/Habitat Management

- Include watershed planning and Multiple Species Habitat Conservation Plan (HCP) information in all management plans. Cooperate with Planning Units.
- Protect and restore PHS habitats.
- Restore shrub-steppe for sage grouse.
- Use appropriate tools to protect key habitats on private lands.
- Chapter 3.1 of the Wildlife Area Plans (Oak Creek and the L.T. Murray/Wenas): Andy Stepniewski (from Audubon and the Cowiche Canyon Conservancy) had questions about this chapter. He asked that if the target number of elk for the Yakima Herd was 9,500, did that not conflict with species diversity and habitat objectives? He was mostly concerned with feed site elk and that concentrated impact, as well as adjacent impact in transition areas as those elk travel in and out. These elk are impacting other species in the concentrated areas. Andy subsequently submitted a letter outlining his concerns and comments in writing with good detail about species affected, loss of biodiversity, and specific areas of concern.
- Ken McNamee of DNR suggested more focus on the importance of down logs and snags to wildlife. Many are removed every year by the illegal cutting of firewood on DFW and DNR lands. Educate and inform with signage and in the hunting and fishing pamphlets, etc.

Issue F: Wildlife Damage

- What about night hunting for damage control? It has been effective in Oregon. What about seeking out those lead cows in herds causing damage during dark hours?
- Suggestion of outsourcing some functions such as damage assessments.
- Suggestion to augment natural controls by predators (cougars, wolves, etc.).
- What about ungulate damage to sensitive habitats, and overuse by not just cattle, but elk?
- Reduction in overgrazing at higher elevations (USFS lands as example) needed to relieve the pressure put on DFW lands and lower range, Ag lands, protected areas.
- More spot hunts need to be organized, but in a better fashion. More communication with adjacent landowners, better coordination across ownerships.

Issue G: Forest Management

- Statement made against DNR logging in the Naneum Basin and other areas on the Colockum Wildlife Area and the destruction of habitat, hiding cover, etc. Is purchase of some of it a solution? There are funding sources out there to pursue.
- Does WDFW have a timber/forest plan in place? Some areas are in need of thinning.

- Comment on the upcoming thinning/habitat improvement planned for an area of the Colockum Wildlife Area on WDFW land, and how that could be a revenue generator for getting other things done. All seemed to be ok with timber management objectives (removal of small fir, focus on the pine habitat, prescribed burning, seeding, etc.) that are currently occurring on the Wildlife Areas.
- Comment that if current thinnings were success stories, WDFW should get the word out, that we needed the good public relations stuff in print to offset all of the negative that we invariably seem to get. “Let folks know!” Group stressed using the newspaper to promote this kind of work.
- Comment that WDFW needs to establish some clear criteria for timber practices on their lands.
- Comment that lodgepole pine stands needed to be treated differently, and when thinned dramatically took out the watershed. He cited two examples in the Wenatchee area.
- Suggestion that we relate our goals to past successful work, and work in progress.
- Encouragement to continue efforts to acquire the perpetual timber rights on all WDFW lands.

Issue H: Land Acquisition

- DFW needs to take better care of what we have.
- Acquire strategic, key habitats and land parcels.
- Discussion of related tools such as agreements with private landowners and private sportsmen’s clubs to work cooperatively on projects like turkey management and protection of game birds.
- Comment regarding use of conservation easements; key is landowner incentives to participate, whether that be in the form of tax breaks or what.
- Discussion on block management units in Montana where access to private lands adjacent to government lands bring day fees of \$10.00 or more per hunter. Benefit was providing control of hunting pressure by limiting the volume of hunters.
- Idea of incentive tags and or sale of access by other means.
- General feeling that private landowners definitely need some recourse, some incentives to allow wildlife on private ownership in any sort of density.
- Game species don’t recognize changes in ownership.
- Concern over the potential land swap between DFW and DNR, and the danger of differing management practices affecting wildlife and habitat. Some felt that there might be alternatives to the land swap that could still help both DFW and DNR. Most felt cooperative management agreements are key to the successful stewardship of public lands.

Issue I: Commercial Use/Non-Renewable Resource Extraction

- Statement that WDFW Commercial Use Permits are too cheap, and the realistic market for this commercial use will bear more. There is money for wildlife and habitat projects to be gained.
- Comment that commercial use fees need to go back to the wildlife area.
- Promote it and the cost/benefit, and it can also be a tool to focus use where we want use.
- Question whether these fees limit use and reduce impact, or if there should be more restrictions on commercial use.

- CAG members wanted to know how much really gets to the W.A? Is it really fee for service? Group consensus that it should be.
- Someone stated/asked that some Wildlife Areas have the potential to make more money than others; should fee money go to the Wildlife Program and be distributed?
- Comment that we may need to be prepared to sacrifice some areas for undesirable uses. DFW could designate some areas for use by motorbikes, mudders, and the like to help limit those uses in more critical areas. There was no consensus amongst group members.
- The managers moved discussion on to commercial and related activity. They posed the question: Should we issue Permits for rock pits, gold panning, removal of petrified wood, etc? There was some discussion about how this affects the habitat, who controls it, and who enforces it.
- Regarding mineral extraction and related activities, group consensus was that unless there is real money in it, or a benefit to fish and wildlife, and then permits should not be issued at all. Discussion followed that spanned from rock hounds to gravel pits. Strong group consensus that strict guidelines need to be established in the plan to define what is allowable, and then DFW needs to make users aware of the rules. The feeling was that many times folks did not know what was allowed, and what was not.

Issue J: Wildlife Releases:

- Comment on the wild turkey management plan. Individual not supportive of only planting birds where a population already exists. Individual felt that the economic benefit of more release sites would outweigh other factors.
- Comment that there are differing opinions on whether or not the turkeys and other game birds should be winter-fed. Most felt that it was dependent on the quality of the habitat how well they would survive, in the interim they should be fed in harsh winters, and over the long haul that good management and habitat development would create a climate for a healthy naturally sustained population. All felt that WDFW should manage for sustainable numbers.
- Some discussion on big horn sheep, more general comments supporting WDFW's winter-feeding programs for several species.

Issue J: Other

- Provide a headquarters/facility for the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. Co-locate this facility with the district office.

APPENDIX 2: L.T. MURRAY/QUILOMENE/WHISKEY DICK WEED MANAGEMENT PLAN

Weed Control Goals on WDFW Lands

The goal of weed control on Department lands is to maintain and improve the habitat for wildlife, meet legal obligations, provide good stewardship and protect adjacent private lands.

Weed control activities and restoration projects that protect and enhance fish and wildlife populations and their habitats on Department lands are a high priority. When managing for specific wildlife species on our lands the weed densities that trigger control are sometimes different than on lands managed for other purposes (e.g. agricultural, etc.). For example, if a weed is present at low densities and does not diminish the overall habitat value, nor pose an immediate threat to adjacent lands, control may not be warranted. WDFW focuses land management activities on the desired plant species and communities, rather than on simply eliminating weeds.

Control for certain, listed species is mandated by state law (RCW 17.10 and 17.26) and enforced by the County Noxious Weed Board. WDFW will strive to meet its legal obligation to control for noxious weeds listed according to state law (Class A, B-Designate, and county listed weeds).

Importantly, WDFW will continue to be a good neighbor and partner regarding weed control issues on adjacent lands. Weeds do not respect property boundaries. The agency believes the best way to gain long-term control is to work cooperatively on a regional scale. As funding and mutual management objectives allow, WDFW will find solutions to collective weed control problems.

Weed Management Approach

State law (RCW 17.15) requires that WDFW use integrated pest management (IPM), defined as a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives, to accomplish weed control. The elements of IPM include:

Prevention- Prevention programs are implemented to keep the management area free of species that are not yet established but which are known to be pests elsewhere in the area.

Monitoring- Monitoring is necessary to implement prevention and to document the weed species, the distribution and the relative density on the management area.

Prioritizing- Prioritizing weed control is based on many factors such as monitoring data, the invasiveness of the species, management objectives for the infested area, the value of invaded habitat, the feasibility of control, the legal status of the weed, past control efforts, and available budget.

Treatment- Treatment of a weeds using biological, cultural, mechanical, and chemical control serves to eradicate pioneering infestations, reduce established weed populations below densities that impact management objectives for the site, or otherwise diminish their impacts. The method used for control considers human health, ecological impact, feasibility, and cost-effectiveness.

Adaptive Management- Adaptive management evaluates the effects and efficacy of weed treatments and makes adjustments to improve the desired outcome for the management area.

The premise behind a weed management plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one only deals with weed problems as they arise.

Weed Species of Concern on the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas

Weeds of concern on the wildlife areas include Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea biebersteinii*), Russian knapweed (*Acroptilon repens*), whitetop (*Cardaria pubescens*), perennial pepperweed (*Lepidium latifolium*), kochia (*Kochia scoparia*), musk thistle (*Carduus nutans*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirsium arvense*), Russian thistle (*Salsola iberica*) and cheat grass (*Bromus tectorum*). This list is based on species that have been documented on the wildlife area (Table 3).

Table 3. L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas weeds including the state and county weed class listing and acres treated.

	2005 State	2005 County	Wildlife	2004
Weed Species	Weed Class	Weed Class	Unit(s)	Treated Acres
Dalmatian Toadflax	B-Designate	B-Designate	L.T. Murray, Quilomene, Whiskey Dick	0.08
Kochia	B	B-Designate	L.T. Murray, Quilomene, Whiskey Dick	5
Musk Thistle	B	B-Designate	Whiskey Dick	0.01
Perennial Pepperweed	B	B-Designate	Quilomene	4
Purple Loosestrife	B	B-Designate	Whiskey Dick	0.8
Spotted Knapweed	B	B-Designate	L.T. Murray	1
Diffuse Knapweed	B	B	L.T. Murray, Quilomene, Whiskey Dick	330
Russian Knapweed	B	B	Quilomene, Whiskey Dick	27
Whitetop	C	C	Quilomene, Whiskey Dick	51
Canada thistle	C	C	L.T. Murray, Quilomene, Whiskey Dick	2
Russian thistle			L.T. Murray, Quilomene, Whiskey Dick	4.5
Cheat grass/ Bulbous bluegrass/ Foxtail barley			L.T. Murray, Quilomene, Whiskey Dick	2

B-Designate are state-listed and mandatory for control to prevent seed production/spread.

New Invader is not an official state classification, but indicates the county reserves the right to implement control.

R&S (Reduction and Suppression) Weeds are of wide distribution. Control along transportation corridors is recommended.

Management for individual weed species can be found in the following “Weed Species Control Plan” (WSCP) sections.

CANADA THISTLE CONTROL PLAN

Scientific name: *Cirsium arvense*

Common name: Canada thistle

Updated: 2006

DESCRIPTION: Canada thistle is a colony-forming perennial from deep and extensive horizontal and vertical roots. Stems are 1 to 4 feet tall, ridged, and branching above. Leaves are alternate, lacking petioles, oblong or lance-shaped, divided into spiny-tipped irregular lobes. Flowers are purple and occasionally white, in heads ½ to ¾ inch in diameter.

Plants are male or female (dioecious) and often grow in circular patches that are one clone and sex. At flowering, female flowers can be readily distinguished from male flowers by the absence of pollen (abundant in male flowers) and presence of a distinct vanilla-like fragrance. A female Canada thistle plant can produce up to 5,200 seeds in a season but the average is about 1,500 seeds/plant. Seed may be transported long distances by water, wind, or attached to animals, clothing, farm equipment and vehicles. Seed can remain viable in soil up to 20 years.

Over-wintering roots develop new underground roots and shoots in January and begin to elongate in February. Shoots emerge between March and May, when mean weekly temperatures reach 5 degrees C, and form rosettes. Early in the season plants remain near the soil surface until long days, over 14 hours of light, trigger flower stem elongation. Flowering occurs from June to October. Seeds mature July to October.

Canada thistle thrives in the Northern Temperature Zone due to its day length response and a high temperature limitation on growth. Although it mainly invades disturbed areas, it does invade native plant communities, open meadows (including wetlands), and ponderosa pine savanna. Canada thistle is adapted to a wide range of soil types and environmental conditions. It is best adapted to rich, heavy loam, clay loam and sandy loam, with an optimal soil depth of 20 inches. It can tolerate saline soils and wet or dry soil. Canada thistle usually occurs in the 17-35 inch annual precipitation zones or where supplemental soil moisture is available.

Canada thistle spreads rapidly through its horizontal roots, which give rise to shoots. Its root system can be extensive, growing horizontally as much as 18 feet in one growing season. Most Canada thistle patches grow at a rate of 3-6 feet per year, crowding out more desirable species and creating thistle monocultures.

Canada thistle is a state-listed class C noxious weed in Kittitas County.

MANAGEMENT INFORMATION:

The key principal to Canada thistle control is to stress the plant and force it to use stored root nutrients. Canada thistle can recover from almost any stress, including control attempts, because of root nutrient stores. Success requires a sound management plan implemented over several years.

Mowing meadows can be an effective tool for Canada thistle control if combined with herbicide treatments. Mowing alone is not effective unless conducted at one-month intervals over several growing seasons.

Curtail (clopyralid + 2,4-D) and Transline (clopyralid), Tordon (picloram), Banvel/Vanquish/Clarity (dicamba) and Telar (chlorsulfuron) are effective against Canada thistle. These herbicides are most effective when combined with cultural and/or mechanical control.

Several insects are currently being used as bio-control agents for Canada thistle. *Ceutorhynchus litura* is a weevil whose larvae bore into the main leaf vein, then down into the plant's crown area. If the insect population is high enough, plant death can occur, otherwise Canada thistle is stressed and less vigorous. The Canada thistle stem gall fly (*Urophora cardui*) also can kill or stress the plant. The female lays eggs on apical meristems of developing shoots. Larvae burrow into shoots. Their feeding triggers huge galls to form that stress the plant. Galls that form near the terminal meristems keep the weed from flowering and reduce seed set.

CURRENT DISTRIBUTION ON THE SITE

Canada thistle is found throughout the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas from low elevation shrub steppe environments to higher elevation forested zones. It often occurs along riparian zones in the major creeks and streams of the area, and is also seen in areas disturbed logging, especially in slash piles and landings.

ACRES AFFECTED BY WEED: 1,000 **WEED DENSITY:** Low

GOALS

Decrease occurrence of Canada thistle on the Wildlife Areas.
Increase quality of infested plant communities.

OBJECTIVE

Survey and map existing Canada thistle populations.
More accurately calculate the acres affected by Canada thistle.
Reduce Canada thistle densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue Canada thistle control with chemical, mechanical and cultural methods.
Research biological control agents for potential releases onto the Wildlife Areas.

CONTROL SUMMARY AND TREND

Canada thistle has been controlled on the wildlife areas as it has been encountered during other weed control activities. Increased logging activity on the Wildlife Area may be contributing to the proliferation of this weed.

2002- Approximately 100 acres were treated.
2003- Approximately 120 acres were treated.
2004- Approximately 160 acres were treated.
2005- Approximately 220 acres were treated.

CHEAT GRASS CONTROL PLAN

Scientific name: *Bromus tectorum*

Common name: Cheat grass, downy brome

Updated: 2006

DESCRIPTION: Cheat grass is an erect winter or spring annual grass. The seedlings are bright green with conspicuously hairy leaves, hence the alternate common name, downy brome. It typically grows 20-24 inches tall, with a finely divided, fibrous root system that may reach a depth of about 12 inches. The stems are erect, slender and glabrous or may be slightly soft-hairy. The nodding, open panicles with moderately awned spikelets are very distinctive. Cheat grass panicles change color from green to purple to brown as the plant matures and eventually dries out. The spikelets readily penetrate fur, socks and pants and its seeds may thus be widely dispersed by people and animals.

Cheat grass is an alien grass that dominates disturbed ground in shrub-steppe ecosystems of the Western United States and Canada. Cheat grass reproduces only from seeds, germinates in the fall or winter, expands its roots over winter, and rapidly exploits the available water and nutrients in early spring. Plants head out in late April to early May and seeds mature in mid to late June. It is common in recently burned rangeland, wildlands, winter crops, waste areas, abandoned fields, eroded areas, and overgrazed grasslands. In undisturbed sites, cheat grass will most commonly spread along soil cracks and work its way outward into the natural community. Cheat grass is a very efficient competitor for early spring moisture, which would otherwise be used by native perennial grasses. In this way, the species can displace native vegetation and inhibit natural succession.

The change induced by cheat grass in the fire cycle frequency is probably the species' greatest competitive advantage. Although fire is a natural part of the sagebrush grassland ecosystem, those fires usually occurred at intervals between 60-100 years. Cheat grass infested areas burn at a much greater frequency, every 3-5 years. At this frequency, native shrubs and perennial grasses cannot recover and after a few cycles a cheat grass monoculture develops.

MANAGEMENT INFORMATION:

The most effective control of cheat grass involves adopting an integrated management approach that may include mowing and burning, chemical applications, and reseeding with competitive plants.

Mowing cheat grass can be somewhat effective at controlling cheat grass seed production, but must be repeated often in the spring, especially during wet periods. Mowed cheat grass plants will tiller and produce new seeds if moisture is available.

Cheat grass is a highly flammable species due to its complete summer drying, its fine structure, and its tendency to accumulate litter. A fire will reduce the plants to ash, but fire intensity may not be great enough to consume the litter layer, and the seeds in the soil will probably survive. If a burn is not followed by reseeding, cheat grass will recover to pretreatment proportions within 3 to 4 years.

There are several types of herbicides that can be used alone or combined to provide effective control of cheat grass. Roundup (glyphosate) effectively controls cheat grass, but is non-selective. Roundup is often used in fallow crop fields to control cheat and preserve moisture for the next crop.

Pre-emergent herbicides such as Prowl, DireX, Outlook, and Maverick can help control this annual grass. Treflan (trifluralin), Hoelon (diclofop), Sencor (metribuzin), Finesse (metsulfuron), and Glean (chlorsulfuron) are herbicides commonly used to control cheat grass in grain crops. Fusilade (fluazifop-p-butyl), Poast (sethoxydim), and Assure (quizalofop) are effective at controlling cheat grass without harming broadleaf most broadleaf plants. Residual, non-selective control of cheat grass in industrial sites, parking areas and similar areas can be accomplished with herbicides such as Krovar (diuron) or Casoron (dichlobenil). Several of these products can be effective at controlling cheat grass in non-crop, rangeland or conservation reserve program (CRP) areas without harming desirable vegetation. Rates and timing are critical to avoid damage to perennial plants.

CURRENT DISTRIBUTION ON THE SITE

Cheat grass is present throughout the Wildlife Areas. It is especially prevalent in old agricultural fields, degraded rangelands and in fire-prone areas.

ACRES AFFECTED BY WEED:2,500

WEED DENSITY: low-high

GOALS

Decrease occurrence of cheat grass on the Wildlife Areas.

Increase quality of infested plant communities.

OBJECTIVE

Survey and map severe cheat grass infestations.

More accurately calculate the acres affected by cheat grass.

Reduce cheat grass densities by using an integrated weed management approach.

Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

2006: Control cheat grass in 600 acres of CRP and agricultural fields by herbicide application, mowing and reseeding.

CONTROL SUMMARY AND TREND

Recent success has been achieved on the Wildlife Area using herbicides (including pre-emergent herbicides) and reseeding.

2002- Approximately 5 acres were treated.

2003- Approximately 10 acres were treated.

2004- Approximately 24 acres were treated.

2005- Approximately 12 acres were treated.

DALMATIAN TOADFLAX CONTROL PLAN

Scientific name: *Linaria dalmatica* ssp. *dalmatica* **Common name:** Dalmatian toadflax
Updated: 2005

DESCRIPTION: Dalmatian toadflax is an erect, short-lived, perennial herb, 0.8 to 1.5 m tall. Dalmatian toadflax is a perennial species that spreads by horizontal or creeping rootstocks and by seed. A mature plant can produce up to 500,000 seeds, which are primarily dispersed by wind. The seeds may live up to ten years in the soil (Robocker 1974; Morishita 1991). Most seedlings emerge in the spring when soil temperature reaches 8° C at 2.5 cm. Germination in the fall is probably limited by soil water content, as well as possibly seed dormancy with the average life span of a plant being three years (Robocker 1974).

Mature Dalmatian toadflax plants are strongly competitive. Studies indicate that plots without Dalmatian toadflax may produce two and a half times as much grass as plots with toadflax (Robocker 1974). Mature plants are especially competitive with shallow-rooted perennials and winter annuals. Because of its competitive ability, Dalmatian toadflax is a concern in pasture and rangelands, as well as in natural areas, where it may out-compete more desirable, native species. Dalmatian toadflax occurs in a variety of habitats, including: roadsides, pastures, rangelands, and waste areas. It has spread most extensively west of the 100th meridian, occurring primarily on coarse-textured soils, ranging from sandy loams to coarse gravels (Alex 1962).

Dalmatian toadflax is a state-listed class B-Designate in the management areas.

MANAGEMENT INFORMATION:

Intensive clean cultivation can effectively control Dalmatian toadflax. A successful approach includes at least a two year effort, with eight to ten cultivations in the first year and four to five cultivations in the second year (Morishita 1991; Butler and Burrill 1994). Cultivation should begin in early June and be repeated so that there are never more than seven to ten days with green growth visible (Butler and Burrill 1994). Since Dalmatian toadflax seedlings do not compete well for soil moisture against established winter annuals and perennials, control efforts should include attempting to establish and manage desirable species that will compete with toadflax (Morishita 1991; Butler and Burrill 1994).

Herbicide can be an effective tool for control and applicators should refer to the PNW Weed Management Handbook, or other reputable resources, for product recommendations and timing.

Calophasia lunula, a defoliating moth, is well-established in Washington and reportedly provides good control (William et al. 1996) and *Mecinus janthinus*, a recently introduced stem boring weevil, shows promise. *Brachypterolus pulicarius*, although usually associated with yellow toadflax, can survive and may reduce seed production of Dalmatian toadflax.

CURRENT DISTRIBUTION ON THE SITE

Small isolated sites on the L.T. Murray, Quilomene and Whiskey Dick Wildlife Areas

The two areas currently being yearly assessed and treated as necessary are at Quilomene Bay, and next to the Vantage Highway where it borders the Whiskey Dick Wildlife Area.

ACRES AFFECTED BY WEED: ~0.05 **WEED DENSITY:** Low (Widely Scattered)

GOALS

Control existing populations

Prevent new occurrences

OBJECTIVES

Survey and map existing populations

More accurately calculate the acres affected by Dalmatian toadflax

Treat all plants before they produce seed

Survey nearby areas for pioneering infestations

ACTIONS PLANNED

In 2006 the known infestations will be spot treated in the spring.

CONTROL SUMMARY AND TREND

2002- Approximately 1 acres were treated.

2003- Approximately 0 acres were treated.

2004- Approximately 2 acres were treated.

2005- Approximately 4 acres were treated.

DIFFUSE KNAPWEED CONTROL PLAN

Scientific name: *Centaurea diffusa*

Common name: Diffuse knapweed

Updated: 2006

DESCRIPTION: Diffuse knapweed is a diffusely branched biennial or short-lived perennial herb, 1 to 2 feet tall. It is a native from southern Europe to north-central Ukraine. This species reproduces only by seed. Diffuse knapweed plants first form low rosettes and may remain in this form for several years depending on environmental conditions. Rosettes over-winter and bolt in early spring. Floral buds are formed in early June, flowering occurs in July and August, and mature seeds are formed by mid-August. Flowers are generally white. A single diffuse knapweed plant can produce up to 18,000 seeds. Seed dispersal is mainly by wind. When the seed capsule sways in the breeze or is disturbed, the seeds fall from the small opening in the top of the flower head and are distributed around the parent plant. However, most involucre remain closed until the plant dries up, breaks off at ground level and effectively becomes a tumbleweed, dispersing seeds over long distances. The stalks readily lodge under vehicles, expanding their dispersal.

Diffuse knapweed is a pioneer species that can quickly invade disturbed and undisturbed grassland, shrub land and riparian communities. It is generally found on light, dry, porous soils. Once established, it out competes and reduces the quality of desirable native species. Diffuse knapweed contains allelopathic chemicals, which can suppress competitive plant growth and create single species stands. Diffuse knapweed stands can range in density from 1-500 plants/m². The replacement of native grasslands with knapweed can reduce biological activity and increase soil erosion.

Diffuse knapweed is a state-listed class B weed. In Kittitas County it has spread rapidly and now infests roadsides, waste areas, disturbed sites, lots, pastures, forests and rangelands.

MANAGEMENT INFORMATION:

Diffuse knapweed is best controlled by a combination of chemical, mechanical and biological methods. Herbicides such as Tordon (picloram), Transline (clopyralid), Curtail (clopyralid + 2,4-D) or Banvel (dicamba) can control diffuse knapweed. A single application of Tordon may control knapweed for two to three years, but the weeds will reinvade the area unless other management techniques are used.

Hand pulling and mowing can reduce knapweed densities, but must be repeated for several years to prevent seed production and deplete the soil seed bank. Much progress has also been made in biological control of diffuse knapweed, with several insects now available that can dramatically reduce knapweed infestations. Seeding competitive, desirable native plants after control of knapweed is required to prevent reinvasion.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the wildlife areas. It is found most commonly along roadsides, in and around agricultural fields and in degraded rangelands on the wildlife areas.

ACRES AFFECTED BY WEED: 840

WEED DENSITY: Low-Medium

GOALS

Decrease occurrence of diffuse knapweed on the Wildlife Areas.
Increase quality of infested plant communities.

OBJECTIVES

Survey and map existing populations.
More accurately calculate the acres affected by diffuse knapweed.
Reduce knapweed densities by biological, chemical, and cultural methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible, such as in agricultural fields or along roadsides and parking areas.
Continue release of biological control insects across the Wildlife Areas.

CONTROL SUMMARY AND TREND

2002- Approximately 38 acres were treated. 500 seed-eating beetles (*Larinus minutus*) released.
2003- Approximately 272 acres were treated. 250 *Larinus* released.
2004- Approximately 315 acres were treated. 500 *Larinus* released.
2005- Approximately 725 acres were treated.

Diffuse knapweed control has reduced weed infestations and occurrence across the Wildlife Areas. Roadsides have been consistently treated to stop seed production and spread by vehicles. Release of insects (*Larinus minutus*) has significantly reduced knapweed populations in the most heavily infested areas.

MUSK THISTLE CONTROL PLAN

Scientific name: *Carduus nutans*

Common name: Musk Thistle

Updated: 2006

DESCRIPTION: Musk thistle is an erect, freely branching biennial weed native to Europe and Asia. It is a deep, tap-rooted plant that grows up to 8 feet tall. The waxy leaves are dark green with a green midrib and mostly white margins. The large flowers are terminal, flat, nodding, purple, sometimes white and surrounded by numerous lance-shaped, spine-tipped bracts. Seedlings usually emerge early in spring, develop into rosettes and spend the first season in this growth stage. Seedling emergence can also occur in the fall. Early in the spring of the second year, over-wintered rosettes resume growth. Shoots bolt in late March through May. Musk thistle flowers and begins to produce seed 45 to 55 days after it bolts. Musk thistle is a prolific seed producer. One plant can produce up to 20,000 seeds, although only one-third of the seeds are viable. Seeds appear to remain viable for at least 10 years.

Musk thistle is a highly competitive weed, which invades disturbed areas, pastures, rangeland, forest land, cropland and waste areas. It does not appear to have any specific climatic requirements other than a cool period of vernalization for flowering. Musk thistle establishes best on bare soil, and small shallow cracks are ideal for seedling establishment. It grows in all soils, but soils must be well-drained. Musk thistle spreads rapidly and forms extensive stands, which force out desirable vegetation. Musk thistle may produce allelopathic chemicals that inhibit desirable plants.

Musk thistle reproduces by seed only. Wind and water are good dissemination methods and seeds also spread by animals, machinery and vehicles.

Musk thistle is a state-listed class B-Designate noxious weed in Kittitas County.

MANAGEMENT INFORMATION:

The best control of musk thistle results from an integrated management approach. Maintaining forest, pasture and rangeland in good condition is a primary factor for musk thistle management. To favor competitive grass growth, do not overgraze. Musk thistle can easily be removed by severing its root below the ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

Several herbicides are effective on musk thistle, including Tordon (picloram), Curtail (clopyralid+2,4-D), and Banvel (dicamba). Apply these herbicides in spring or fall to musk thistle rosettes. The use of a good surfactant will enhance penetration. Due to the long seed viability of musk thistle, control methods may have to be repeated for many years to completely eliminate a stand.

Several seed head weevils (*Rhinocyllus* and *Trichosiromus* spp.) may be available and can reduce seed production significantly.

CURRENT DISTRIBUTION ON THE SITE

There is one known site on the Whiskey Dick Wildlife Area.

ACRES AFFECTED BY WEED: 0.01

WEED DENSITY: Low

GOALS

Control existing populations

Prevent new occurrences

OBJECTIVES

Survey and map existing musk thistle populations.

More accurately calculate the acres affected by musk thistle.

Reduce musk thistle densities by using an integrated weed management approach.

Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on known infestations where feasible.

Continue digging and cutting flower heads when appropriate.

Research new advances in biological control of musk thistle.

CONTROL SUMMARY AND TREND

2002- Approximately 0.0 acres were treated.

2003- Approximately 0.0 acres were treated.

2004- Approximately 0.1 acres were treated.

2005- Approximately 0.1 acres were treated.

PERENNIAL PEPPERWEED CONTROL PLAN

Scientific name: *Lepidium latifolium*

Common name: Perennial Pepperweed

Updated: 2006

DESCRIPTION: Perennial Pepperweed is an erect, branching, perennial forb that grows one to three feet high, but may reach heights of eight feet in wet areas. The base of the stems is semi-woody. The roots enlarge at the soil surface to form a woody crown. The toothed leaves are lance-shaped and are bright green to gray-green and may have a leathery texture. Dense white flower clusters of six to eight tiny blossoms occur near the ends of the stems around mid-June. Perennial pepperweed is a prolific seed producer, capable of producing more than six billion seeds per acre of infestation. In addition to seeds, perennial pepperweed spreads by creeping underground roots (rhizomes) that may grow to a length of ten feet. New plants shoot up from the underground roots and enable perennial pepperweed to form dense monocultures.

Perennial pepperweed is most often found in open, un-shaded areas on disturbed, and often saline soils. It is common in riparian areas, valley bottoms, and seasonally wet areas. It is a very competitive species that crowds out desirable vegetation and results in dense monocultures and a decrease in biodiversity. When established along rivers and streams, the plant interferes with the regeneration of willows and cottonwoods, reducing the quality of habitat for wildlife.

Perennial pepperweed spreads in many ways. The plant commonly travels in rivers and irrigation systems as seeds and rhizomes from eroded banks. Seeds are transported when they attach themselves to machinery and vehicle tires.

Perennial pepperweed is a state-listed class B-Designate weed in Kittitas County.

MANAGEMENT INFORMATION:

The best method of managing perennial pepperweed is to prevent the weed from becoming well established. Minimizing soil disturbances from vehicles, machinery and overgrazing will reduce areas where the weed might become established. Heavy, vigorous grass stands that are properly managed can limit the establishment of this weed.

Once perennial pepperweed is established, control is difficult because the plant is so competitive and spreads rapidly by its creeping roots. The weed is usually found on sites difficult to access and along waterways where control presents special challenges. Eradication of perennial pepperweed is impossible in most cases. Instead, efforts and resources should be focused on preventing its spread and using an integrated weed management program.

Mechanical control of perennial pepperweed is not recommended. Digging, mowing and tilling will only encourage new plants to sprout from the root crown and creeping roots. Chemical control of perennial pepperweed is best achieved by using Telar (chlorsulfuron) or Escort (metsulfuron). Apply Telar during bud to early bloom stage, and apply Escort before bud and bloom, but while plants are actively growing. To successfully manage perennial pepperweed with chemicals, competitive vegetation must be established immediately after its control to prevent reinvasion.

CURRENT DISTRIBUTION ON THE SITE

On the Wildlife Areas perennial pepperweed is found along streams, creeks and other riparian zones. It is common in disturbed areas such as old homesteads and abandoned agricultural fields in valley bottoms.

ACRES AFFECTED BY WEED: 15

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations.
More accurately calculate the acres affected by perennial pepperweed.
Reduce pepperweed densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.
Research the availability of biological controls (insects) for perennial pepperweed.

CONTROL SUMMARY AND TREND

2002- Approximately 3 acres were treated.
2003- Approximately 27 acres were treated.
2004- Approximately 4 acres were treated.
2005- Approximately 8 acres were treated.

PURPLE LOOSESTRIFE CONTROL PLAN

Scientific name: *Lythrum salicaria*

Common name: Purple Loosestrife

Updated: 2006

DESCRIPTION: Purple loosestrife is an erect, long-lived perennial forb or sub-shrub introduced from Europe. The square, annual stems arise from a perennial rootstock and often grow 6-8 feet tall. The leaves are lance-shaped and entire, and are whorled. The magenta-colored flowers are arranged in racemes. A single flowering stalk can produce 300,000 seeds, and densities as high as 80,000 stalks per acre have been recorded. Purple loosestrife seed may remain viable for up to 20 years.

Purple loosestrife usually occurs in marshes, wet meadows, stream banks, and the shores of lakes and wetlands. It is commonly associated with cattails, reed canary grass, sedges, bulrushes, reeds, and willows. Purple loosestrife can tolerate a wide range of growing conditions (up to 50% shade), can grow on calcareous and acidic soils and will even grow in standing water.

Purple loosestrife is an aggressive invader of wetlands. Spring established seedlings grow rapidly and produce flowers 8 to 10 weeks after germination. Purple loosestrife germinates at such high densities that it out competes native seedlings. The invasion of purple loosestrife leads to a loss of plant diversity, which also leads to a loss of wildlife diversity. If left unchecked, the wetland eventually becomes a monoculture of loosestrife.

Purple loosestrife seeds are mainly distributed by water, but can also be dispersed by animals and humans. Seeds do not drop from the seed capsules until the air temperature becomes cold in the fall. The plant also reproduces by rhizomes, and detached root or stem fragments can take root and develop into flowering stems.

Purple loosestrife is a state-listed class B-Designate weed in Kittitas County.

MANAGEMENT INFORMATION:

Loosestrife populations, which extend over three acres are difficult to eradicate and may be a better target for containment rather than control. The key to effective control is early detection when infestations are small. It is fairly easy to control small numbers of loosestrife plants when the seed bank in the soil is small. Small loosestrife infestations should be eradicated by hand-pulling or herbicide application. Herbicides available for use in wetlands are limited. Biological control of loosestrife has shown very promising results. The *Galerucella* beetle defoliates the leaves and buds of the plant, and should be considered where the population of loosestrife has become large or inaccessible. However, 100% control is not feasible with the use of beetles alone.

CURRENT DISTRIBUTION ON THE SITE

On the Quilomene and Whiskey Dick Wildlife Areas, purple loosestrife is common along the banks of the Columbia River. It has also been found in the riparian areas along the major creeks and streams of the area, and around springs and ponds.

ACRES AFFECTED BY WEED: 5

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVE

Survey and map existing purple loosestrife populations.
More accurately calculate the acres affected by purple loosestrife.
Reduce purple loosestrife densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on individual plants and small infestation where possible.
Encourage biological controls (insects) by restricting the use of insecticides in wetlands.

CONTROL SUMMARY AND TREND

2002- Approximately 0.1 acres were treated.
2003- Approximately 0.0 acres were treated.
2004- Approximately 0.8 acres were treated.
2005- Approximately 0.5 acres were treated.

Purple loosestrife is common along the Columbia River on the Quilomene and Whiskey Dick Wildlife Areas, but has not formed large colonies. This is most likely due to the effects of the *Galerucella* beetle and some careful herbicide applications.

RUSSIAN KNAPWEED CONTROL PLAN

Scientific name: *Centaurea repens*

Common name: Russian Knapweed

Updated: 2006

DESCRIPTION: Russian knapweed is a creeping, herbaceous perennial that reproduces from seed and vegetative root buds. Shoots, or stems are erect, 18 to 36 inches tall, with many branches. Flowers are urn-shaped, solitary and can be pink, lavender or white. Russian knapweed has vertical and horizontal roots that have a distinctive, brown to black, scaly appearance. It emerges in the early spring, bolts in May to June, and flowers through the summer into fall. It produces seeds sparingly, approximately 50 to 500 per shoot. Seeds are viable for two to three years in soil. Its primary method of reproduction is from vegetative propagation, with seeds of secondary importance.

Russian knapweed is native to southern Ukraine, southeast Russia, Iran, Kazakhstan and Mongolia. Locally, it can commonly be found along roadsides, riverbanks, irrigation ditches, pastures, waste places, clear cuts, and croplands, especially in areas of high water tables. It is not restricted to any particular soil but does especially well on clay soils. Russian knapweed typically invades degraded areas, dominating the plant community by forming dense colonies. It uses a combination of adventitious shoots and allelopathic chemicals to spread outward into previously undisturbed areas. Vertical roots can penetrate the soil up to 8 feet. Russian knapweed contains an allelopathic polyacetylene compound, which inhibits the root growth of competing plants. Stands may survive 75 years or longer.

Russian knapweed is state-listed class B-Designate weed in Kittitas County. It is a relatively new invader to the county and is spreading rapidly.

MANAGEMENT INFORMATION:

The most effective method of control for Russian knapweed is to prevent its establishment through proper land management. The healthier the natural community, the less susceptible it will be to Russian knapweed invasion. In areas already infested, the key to control is to stress the weed and cause it to expend nutrient stores in its root system. An integrated approach usually is more successful than one control technique. Mowing Russian several times a year can help suppress the plant. Applications of herbicides such as Tordon (picloram), Curtail (clopyralid + 2,4-D) and Escort (metsulfuron) and Roundup (glyphosate) can also suppress the weed, but in most cases an herbicide alone will not effectively manage Russian knapweed. Herbicide treatment, tillage to overcome the allelopathic effects of the plant and reseeding with competitive vegetation (e.g. perennial grasses) show the most effective results.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the Quilomene and Whiskey Dick Wildlife Areas from low to mid elevations in riparian zones, meadows and old agricultural fields.

ACRES AFFECTED BY WEED: 60

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing Russian knapweed populations.
More accurately calculate the acres affected by Russian knapweed.
Reduce Russian knapweed densities by chemical, mechanical and biological methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.
Use tillage and reseeding where possible.
Research new advances in biological control of Russian knapweed.

CONTROL SUMMARY AND TREND

2002- Approximately 104 acres were treated.
2003- Approximately 12 acres were treated.
2004- Approximately 28 acres were treated.
2005- Approximately 19 acres were treated.

Control has slowly reduced the number of acres affected by Russian knapweed on the Wildlife Areas. Control is complicated by its prevalence in remote locations and proximity to high value riparian zones.

RUSSIAN THISTLE CONTROL PLAN

Scientific name: *Salsola iberica*

Common name: Russian thistle, tumbleweed

Updated: 2006

DESCRIPTION: Russian thistle is a brushy summer annual with numerous slender ascending stems that become quite woody at maturity. Stems are from 8 to 36 inches in length and usually have reddish to purplish stripes. Seedlings have very finely dissected leaves that are fleshy, dark green and about 1 inch in length. As the plant matures in July to October the older leaves are short and stiff with a sharp-pointed tip. The overall shape of the plant becomes oval to round and may attain a diameter of 18 inches to 6 feet at maturity. After the plant dries, the base of the stem becomes brittle and breaks off at soil level during fall and early winter. These round, thorny plants are capable of dispersing seed for miles as they tumble along in the wind. A large Russian thistle plant may produce 200,000 seeds.

The Russian thistle seed is a naked, coiled embryo that begins to uncoil when it is exposed to the proper temperature (52 to 90 deg. F) and moisture conditions. As it uncoils, the taproot extends into the soil within about 12 hours, making the germination period quite rapid and giving Russian thistle a decided advantage under limited moisture conditions. A limited amount of moisture, lasting only a few hours, will allow germination and root growth to deeper, subsurface moisture.

Likely sites for germination include vacant lots, agricultural fields, roadsides, fence lines, overgrazed rangelands, or any open site with loosened soil. Germination usually occurs in late fall or early spring, when the seed can take advantage of winter moisture. Seed viability is rapidly lost in the soil. Over 90% of the seed either germinate or decay in the soil during the first year.

In agricultural areas, Russian thistle can reduce yield and quality of numerous crops, particularly alfalfa and small grains. It depletes soil moisture, interferes with tillage and serves as shelter or food source to many insects, vertebrate pests, and crop diseases. Russian thistle can also threaten native plant ecosystems. It is very competitive when moisture is a limiting factor to the growth of other vegetation, when soils are disturbed, or when competing vegetation is suppressed due to overgrazing or poor crop establishment.

Russian thistle is not a state-listed noxious weed in Kittitas County.

MANAGEMENT INFORMATION:

Cultural practices such as mowing or destroying young plants can prevent seed production. Burning is sometimes used to destroy accumulated Russian thistle plants. This may eliminate the accumulated organic debris and some seed, but much of the seed will already have been disseminated. Planting competitive, more desirable species can be an effective method of preventing Russian thistle establishment in most non-crop environments.

There are many herbicides that will control Russian thistle in agricultural crops and non-crop areas. On the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas, some of the post-emergent herbicides that have been successfully used on Russian thistle include Tordon, Banvel and 2,4-D. For best results, these herbicides must be applied while the weed is in its early growth stages, preferably the early seedling stage, before it becomes hardened and starts producing its spiny

branches. If rain or irrigation occurs after a post-emergent application, additional seedlings may emerge and require future treatments.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the Wildlife Areas, at elevations generally below 4000 feet. Commonly found along roads, in old agricultural fields, and in degraded rangeland.

ACRES AFFECTED BY WEED: 800

WEED DENSITY: Low-medium

GOALS

Control existing populations

Prevent new occurrences

OBJECTIVE

Survey and map existing Russian thistle populations.

More accurately calculate the acres affected by Russian thistle.

Reduce Russian thistle densities by using an integrated weed management approach.

Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue Russian thistle control efforts by mowing, herbicide treatments and planting competitive vegetation.

Continue roadside spray program to reduce occurrence of Russian thistle along roads and parking areas.

CONTROL SUMMARY AND TREND

Roadsides on the Wildlife Area have been treated for weeds since 1998. Russian thistle occurs only sporadically along roads and in parking areas. Major infestations have occurred on the restoration sites on the Wildlife Area, but are greatly reduced as the seeded perennial vegetation becomes established.

2002- Approximately 5 acres were treated.

2003- Approximately 10 acres were treated.

2004- Approximately 25 acres were treated.

2005- Approximately 48 acres were treated.

SCOTCH THISTLE CONTROL PLAN

Scientific name: *Onopordium acanthium*

Common name: Scotch Thistle

Updated: 2006

DESCRIPTION: Scotch thistle is an erect, biennial, and some times annual weed that grows up to 12 feet tall. Its large, coarsely lobed, hairy leaves have a velvety-gray appearance and are lined with sharp, conspicuous spines. The stems are branching, with spiny leaf wings extending down the stems from the leaves. Scotch thistle has purple to violet flowers and a large, fleshy taproot.

Scotch thistle is a biennial that produces a large, ground level rosette the first year and a tall, spiny plant the second. It reproduces only by seed, with one plant producing 70-100 flowering heads containing 100-140 seeds per seed head. Seeds may remain viable in the soil for over 30 years. Plumed seeds are dispersed by wind and by attaching to clothing and animal fur. Seeds may also be transported in hay and machinery, or be carried by wind and water.

Scotch thistle grows in sunny areas where soils have been disturbed and competition from other plants has been reduced. It is often found along roadsides, irrigation ditches, waste areas, and on rangelands. It is especially fond of areas that are adjacent to riparian or sub-irrigated deeper soils along stream courses, lower alluvial slopes and bottomlands. Once scotch thistle becomes established and forms a defined colony, it spreads by dominating other plants. Its large size and quick growth takes light, nutrient and water from other plants, while its rigid growth and spines protect the plant from grazing and trampling. Scotch thistle also contains a germination inhibitor that allows only a portion of its seeds to germinate each year while stopping other plant seeds from sprouting.

SCOTCH THISTLE

Scotch Thistle is a state-listed class B noxious weed in Kittitas County. It is a fairly recent invader of the county and a high priority for control.

MANAGEMENT INFORMATION:

Scotch thistle is best controlled in the rosette stage. Its taproot can easily be severed with a shovel 1-2 inches below the ground. Control can be enhanced by a follow-up application of herbicides to surviving rosettes. An integrated approach to scotch thistle management involves 1) managing grazing to increase grass vigor and reduce ground disturbance; 2) spray rosettes with Tordon (picloram), Curtail (clopyralid), Escort (metsulfuron) or Weedmaster (2,4-D + dicamba); 3) follow-up with spot cutting of entire plants when the first flowers appear annually for several years to deplete the seed bank in the soil.

CURRENT DISTRIBUTION ON THE SITE

Scotch thistle has not been found on the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. Several plants were found just north of the Quilomene in the Tekison Creek drainage at the Stray Gulch junction, and these plants were eradicated. Scotch thistle is also found to the south on the Wenas Wildlife Area. Therefore, the threat of spreading to the Wildlife Areas is high.

ACRES AFFECTED BY WEED: None Known

WEED DENSITY: Low

GOALS

Keep the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas free of scotch thistle.
Reduce spread of Scotch thistle from adjacent lands.

OBJECTIVE

Survey and map any existing scotch thistle populations.
More accurately calculate the acres affected by scotch thistle.
Control scotch thistle by using an integrated weed management approach.
Rehabilitate any degraded areas with competitive native plants.

ACTIONS PLANNED

In 2006, weed surveys will continue and any plants found will be eradicated.

CONTROL SUMMARY AND TREND

2002- Approximately 2.0 acres were treated.
2003- Approximately 0.1 acres were treated.
2004- Approximately 0.0 acres were treated.
2005- Approximately 0.0 acres were treated.

Scotch thistle has not yet become established on the Wildlife Areas. However, plants are present on neighboring lands and will probably spread to the Wildlife Areas.

SPOTTED KNAPWEED CONTROL PLAN

Scientific name: *Centaurea malculosa*

Common name: Spotted knapweed

Updated: 2006

DESCRIPTION: Spotted knapweed is a short-lived, perennial herb, 1-3 feet tall. It reproduces from seed and forms a new shoot each year from a taproot. Like diffuse knapweed, it is a native to central Europe. It can be distinguished from its close relative diffuse knapweed by the lack of a terminal spine at the tip of its bracts. Flowers are pinkish-purple or rarely cream colored. Spotted knapweed seeds germinate in spring or fall. The seedlings develop into and remain as rosettes for at least one growing season while root growth occurs. It usually bolts in May of its second growing season and flowers August through September. It is a prolific seed producer, and can produce up to 140,000 seeds/m². Seeds may remain viable in the soil for over 8 years. Seeds are spread by wind, with most seeds being shed immediately after reaching maturity.

Spotted knapweed is a highly competitive weed that invades disturbed areas and degrades desirable plant communities. It is found in light, porous soils, fertile, well-drained and often calcareous soils in warm areas. It occupies dry meadows, pastureland, stony hills roadsides and sandy or gravelly floodplains of streams and rivers. Spotted knapweed tolerates dry conditions, similar to diffuse knapweed, but survives in higher moisture areas as well, preferring areas that receive 12 to 30 inches of annual precipitation. Like diffuse knapweed, spotted knapweed has been reported to contain cnicin, an allelopathic chemical. Cnicin inhibits root growth of other plants, and destroys their ability to compete for limited soil moisture and nutrients.

Spotted knapweed is a state-listed class B-Designate weed in Kittitas County. It has spread rapidly through many areas of the upper county and is now showing up in the lower county as well.

MANAGEMENT INFORMATION:

Spotted knapweed can be managed similarly to diffuse knapweed. It is readily controlled with herbicides such as Tordon, Transline, Banvel or Clarity. One pint/acre of Tordon will control spotted knapweed for two to three years, but the weed will reinvade the area unless other management techniques are used. As with diffuse knapweed, seeding competitive, desirable native plant species after control of spotted knapweed is required to prevent reinvasion.

Hand pulling and mowing can reduce spotted knapweed densities but is labor intensive and not suited to large infestations. Seed production must be prevented for many years to prevent reestablishment. Similarly to diffuse knapweed, several insects have been found to be effective as biological control agents for spotted knapweed. These include seedhead flies (*Urophora, spp.*) a root-feeding beetle (*Cyphocleonus achates*), and several seedhead weevils (*Bangasternus* and *Larinus spp.*) The larvae of the yellow-winged knapweed moth (*Agapeta zoegana*) feeds in the roots of both knapweed species.

CURRENT DISTRIBUTION ON THE SITE

Spotted knapweed is found in a few localized areas of the L.T. Murray Wildlife Area, but infestations are not as severe as diffuse knapweed. Found in higher precipitation, higher elevation sites.

ACRES AFFECTED BY WEED: 15

WEED DENSITY: Low.

GOALS

Control existing populations of spotted knapweed on the L.T. Murray Wildlife Area.
Prevent new occurrences

OBJECTIVES

Survey and map existing spotted knapweed populations.
More accurately calculate the acres affected by spotted knapweed.
Reduce spotted knapweed densities by chemical, mechanical and biological methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.
Continue release of biological control insects across the Wildlife Area.

CONTROL SUMMARY AND TREND

2002- Approximately 5 acres were treated.
2003- Approximately 4 acres were treated.
2004- Approximately 9 acres were treated.
2005- Approximately 9 acres were treated.

Spotted knapweed control has reduced weed infestations and occurrence across the Wildlife Area. Roadsides have been consistently treated to stop seed production and spread by vehicles. Insect releases (*Larinus*) have reduced knapweed densities but more releases of a variety of insects are needed.

WHITE TOP (HOARY CRESS) CONTROL PLAN

Scientific name: *Cardaria draba*

Common name: White top, hoary cress

Updated: 2006

DESCRIPTION: White top is an erect, perennial herb growing up to 2 feet tall. Flowers are small, white with numerous flower branches giving the plant a dense, white, flat-topped appearance. The plant reproduces by seed and an extensive creeping root system. Roots spread vertically and horizontally with frequent shoots arising from the rootstock. One plant can produce from 1,200 –4,800 seeds. Seeds can remain viable for three years in the soil. Plants emerge very early in the spring. Plants flower from May to June, and set seed by mid-summer. If conditions are favorable, a second crop of seeds can be produced in the fall.

White top is invading rangelands throughout North America. It is a highly competitive weed once it becomes established. In the absence of a competitor, a single plant can spread over an area of 12 feet in diameter in a single year. It spreads primarily by its extremely persistent roots and will eventually eliminate desirable vegetation and become a monoculture. White top is found on generally open, un-shaded disturbed ground. It grows well on alkaline soils that are wet in late spring and in areas with moderate amounts of rainfall. It is widespread in fields, waste places, meadows, pastures, croplands, and along roadsides.

MANAGEMENT INFORMATION:

Properly managed plant communities help resist white top invasion. Early infestations can be pulled or grubbed, however this plant will re-sprout from any remaining roots, making mechanical control difficult. Tillage is generally considered ineffective and usually contributes to the spread of the infestation by spreading the root fragments. Mowing will prevent seed production but does not kill the plant and the infestation will continue to spread through underground root systems. Chemicals such as Escort (metsulfuron) and Telar (chlorsulfuron) are very effective when applied from bud to flower stage and also in the fall. Due to its hairy leaf surface, a good surfactant is required. Seeding competitive, desirable native vegetation after control is required to help prevent reinvasion.

White top is a state-listed class C weed. In Kittitas County there has been a rapid increase of infestations in the last several years.

CURRENT DISTRIBUTION ON THE SITE

Found on the Wildlife Areas at low to mid elevations in riparian zones, old agricultural fields, old homestead areas and roadsides.

ACRES AFFECTED BY WEED: 140

WEED DENSITY: Low.

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations.

More accurately calculate the acres affected by white top.
Reduce white top densities by chemical, cultural and biological methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications where appropriate.
Seed treated areas to promote competitive vegetation.
Research advances in biological control of white top.

CONTROL SUMMARY AND TREND

2002- Approximately 11 acres were treated.
2003- Approximately 53 acres were treated.
2004- Approximately 67 acres were treated.
2005- Approximately 87 acres were treated.

Whitetop populations have been reduced by herbicide treatments in some areas. Infestations need continued work to keep them from spreading.

GENERAL WEEDS CONTROL PLAN

Scientific name: *Many*

Common name: General Weeds

Updated: 2005

DESCRIPTION: General weeds describe mixed vegetation that interferes with maintenance, agricultural, or restoration activities, where keying plants to individual species is not appropriate. Examples of general weeds may include vegetation occurring along roadsides, parking areas, trails, and structures. General weeds may also occur in agricultural fields, or comprise the dominant vegetation at a site identified for habitat restoration.

MANAGEMENT INFORMATION:

Herbicide can be an effective tool for control and applicators should refer to the PNW Weed Management Handbook, or other reputable resources, for product recommendations and timing depending on the weed and desired management objectives.

Mechanical weed control may include mowing, burning, to the plowing and disking entire fields.

CURRENT DISTRIBUTION ON THE SITE

All public accesses and roadsides, as well as old agricultural fields and degraded rangeland on the Wildlife Areas contain general weeds to varying degrees.

ACRES AFFECTED BY WEED: 1,500

WEED DENSITY: High

GOALS

Maintain public access
Restore agricultural fields
Reduce fire danger

OBJECTIVES

Treat high public use areas with residual herbicide to prevent seed production.
Summer fallow fields in second phase of restoration.
Maintain firebreaks

ACTIONS PLANNED

In 2006, problematic portions of roadsides, parking lots, access sites, and trailheads will be treated to minimize the production and spread of weed seeds and improve appearance and public access for the entire season. In addition, general weed treatment will occur along roads used as firebreaks on the wildlife area to keep fuels to a minimum, especially where our lands lie adjacent to residential areas.


CONTROL SUMMARY AND TREND

Roadside and access management have required a consistent, yearly maintenance effort. Some of the increase in general weed management reflects the restoration work that has occurred in recent years on the Wildlife Areas.

2002- Approximately 300 acres were treated.

2003- Approximately 400 acres were treated.
2004- Approximately 530 acres were treated.
2005- Approximately 565 acres were treated.

Table 4. 2005 Kittitas County Noxious Weed List

For more information on a specific weed, please visit the [Washington State Noxious Weed Control Board](#) .

Class A Noxious Weeds				
Common Name	Scientific Name			
Bean-caper, Syrian	<i>Zygophyllum fabago</i>			Indicates those noxious weeds known to exist in Kittitas County. If you are aware of the existence of any noxious weeds in Kittitas County not highlighted in this list, please contact our office.
Blueweed, Texas	<i>Helianthus ciliaris</i>			
Broom, Spanish	<i>Spartium junceum</i>			
Buffalo bur	<i>Solanum rostratum</i>			
Clary, meadow	<i>Salvia pratensis</i>			
Cord grass, salt meadow	<i>Spartina patens</i>			
Crupina, common	<i>Crupina vulgaris</i>			
Dense flower cord grass	<i>Spartina densiflora</i>			
Flax, spurge	<i>Thymelaea passerina</i>			
Four o'clock, wild	<i>Mirabilis nyctaginea</i>			
Goatsrue	<i>Galega officinalis</i>			
Hawkweed, yellow devil	<i>Hieracium floribundum</i>			
Hogweed, giant	<i>Heracleum mantegazzianum</i>			
Hydrilla	<i>Hydrilla verticillata</i>			
Johnsongrass	<i>Sorghum halepense</i>			
Knapweed, bighead	<i>Centaurea macrocephala</i>			
Knapweed, Vochin	<i>Centaurea nigrescens</i>			
Kudzu	<i>Pueraria montana</i>			
Lawnweed	<i>Solvia sessilis</i>			
Mustard, garlic	<i>Alliaria petiolata</i>			
Nightshade, silverleaf	<i>Solanum elaeagnifolium</i>			
Sage, Clary	<i>Salvia sclarea</i>			
Sage, Mediterranean	<i>Salvia aethiopis</i>			
Spurge, eggleaf	<i>Euphorbia oblongata</i>			
Starthistle, purple	<i>Centaurea calcitrapa</i>			
Thistle, Italian	<i>Carduus pycnocephalus</i>			
Thistle, milk	<i>Silybum marianum</i>			
Thistle, slenderflower	<i>Carduus tenuiflorus</i>			
Velvetleaf	<i>Abutilon theophrasti</i>			
Woad, dyers	<i>Isatis tinctoria</i>			
Class B Noxious Weeds				
Common Name	Scientific Name			
Alyssum, Hoary	<i>Bertero aincang</i>			
Arrowhead, grass-leaved	<i>Sagittaria graminea</i>			
Blackgrass	<i>Alopecurus myosuroides</i>			
Blueweed	<i>Echium vulgare</i>			
Broom, Scotch	<i>Cytisus scoparius</i>			

Bryony, white	<i>Bryonia alba</i>			
Bugloss, annual	<i>Anchusa arvensis</i>			
Bugloss, common	<i>Anchusa officinalis</i>			
Camelthorn	<i>Alhaga maurorum</i>			
Carrot, wild	<i>Daucus carota</i>			
Catsear, common	<i>Hypochaeris radicata</i>			
Chervil, wild	<i>Anthriscus sylvestris</i>			
Cinquefoil, sulfur	<i>Potentilla recta</i>			
Cordgrass, common	<i>Spartina anglica</i>			
Cordgrass, smooth	<i>Spartina alterniflora</i>			
Daisy, oxeye	<i>Leucanthemum vulgare</i>			
Elodea, Brazilian	<i>Egeria densa</i>			
Fanwort	<i>Cabomba caroliniana</i>			
Fieldcress, Austrian	<i>Rorripa austriaca</i>			
Floating heart, Yellow	<i>Nymphoides peltata</i>			
Gorse	<i>Ulex europaeus</i>			
Hawkweed, mouseear	<i>Hieracium pilosella</i>			
Hawkweed, orange	<i>Hieracium aurantiacum</i>			
Hawkweed, polar	<i>Hieracium atratum</i>			
Hawkweed, queendevil	<i>Hieracium glomeratum</i>			
Hawkweed, smooth	<i>Hieracium laevigatum</i>			
Hawkweed, yellow	<i>Hieracium caespitosum</i>			
Hedge parsley	<i>Torillis arvensis</i>			
Helmet, policeman's	<i>Impatiens glandulifera</i>			
Herb-Robert	<i>Geranium robertianum</i>			
Houndstongue	<i>Cynoglossum officinale</i>			
Indigobush	<i>Amorpha fruticosa</i>			
Knapweed, black	<i>Centaurea nigra</i>			
Knapweed, brown	<i>Centaurea jacea</i>			
Knapweed, diffuse	<i>Centaurea diffusa</i>			
Knapweed, meadow	<i>Centaurea pratensis</i>			
Knapweed, Russian	<i>Acroptilon repens</i>			
Knapweed, spotted	<i>Centaurea maculosa</i>			
Knotweed, Bohemian	<i>Polygonum bohemicum</i>			
Knotweed, giant	<i>Polygonum sachalinense</i>			
Knotweed, Himalayan	<i>Polygonum polystachyum</i>			
Knotweed, Japanese	<i>Polygonum cuspidatum</i>			
Kochia	<i>Kochia scoparia</i>			
Lepyrodictis	<i>Lepyrodictis holosteoides</i>			
Loosestrife, garden	<i>Lysimachia vulgaris</i>			
Loosestrife, purple	<i>Lythrum salicaria</i>			
Loosestrife, wand	<i>Lythrum virgatum</i>			
Nutsedge, yellow	<i>Cyperus esculentus</i>			

Oxtongue hawkweed	<i>Picris hieracioides</i>			
Parrotfeather	<i>Myriophyllum aquaticum</i>			
Pepperweed, perennial	<i>Lepidium latifolium</i>			
Primrose, water	<i>Ludwigia hexapetala</i>			
Puncturevine	<i>Tribulus terrestris</i>			
Ragwort, Tansy	<i>Senecio jacobaea</i>			
Saltcedar	<i>Tamarix ramosissima</i>			
Sandbur, longspine	<i>Cenchrus longispinus</i>			
Skeletonweed, rush	<i>Chondrilla juncea</i>			
Sowthistle, perennial	<i>Sonchus arvensis</i>			
Spurge, leafy	<i>Euphorbia esula</i>			
Spurge, myrtle	<i>Euphorbia myrsinites</i> L.			
Starthistle, yellow	<i>Centaurea solstitialis</i>			
Swainsonpea	<i>Sphaerophysa salsula</i>			
Thistle, musk	<i>Carduus nutans</i>			
Thistle, plumeless	<i>Carduus acanthoides</i>			
Thistle, Scotch	<i>Onopordum acanthium</i>			
Toadflax, Dalmatian	<i>Linaria dalmatica</i>			
Watermilfoil, Eurasian	<i>Myriophyllum spicatum</i>			
Class C Noxious Weeds				
Common Name	Scientific Name			
Babysbreath	<i>Gypsophila paniculata</i>			
Bindweed, field	<i>Convolvulus arvensis</i>			
Cockle, white	<i>Silene latifolia</i>			
Cocklebur, spiny	<i>Xanthium spinosum</i>			
Cress, hoary	<i>Cardaria draba</i>			
Dodder	<i>Cuscuta approximata</i>			
Goatgrass, jointed	<i>Aegilops cylindrica</i>			
Groundsel, common	<i>Senecio vulgaris</i>			
Hawkweed, non-native species	<i>Hieracium</i> spp.			
Henbane, black	<i>Hyoscyamus niger</i>			
Iris, yellow flag	<i>Iris pseudocorus</i>			
Mayweed, scentless	<i>Matricaria perforata</i>			
Old man's beard	<i>Clematis vitalba</i>			
Poison-hemlock	<i>Conium maculatum</i>			
Reed, common, non-native	<i>Phragmites australis</i>			
Spikeweed	<i>Hemizonia pungens</i>			
St. Johnswort, common	<i>Hypericum perforatum</i>			
Tansy, common	<i>Tanacetum vulgare</i>			
Thistle, bull	<i>Cirsium vulgare</i>			
Thistle, Canada	<i>Cirsium arvense</i>			
Toadflax, yellow	<i>Linaria vulgaris</i>			
Water lily, fragrant	<i>Nymphaea odorata</i>			

Whitetop, hairy	<i>Cardaria pubescens</i>			
Wormwood, absinth	<i>Artemisia absinthium</i>			

APPENDIX 3: FIRE MANAGEMENT PLAN

Responsible Fire-Suppression Entities: The majority of the L.T. Murray Wildlife Area is made up of forested habitats. Ponderosa pine, Douglas fir, grand fir, western larch and other species make up the forest types on the Wildlife Area. The Wildlife Area is completely within the State Fire Protection Boundary and therefore wildfire suppression activities within this boundary are under the jurisdiction of WDNR. WDFW pays a timber tax assessment fee for each acre within the fire protection boundary for these services.

The Quilomene and Whiskey Dick Wildlife Areas are non-forested, grassland and shrub-steppe lands that are included in a fire suppression agreement between the Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Natural Resources (WDNR). This is not a guaranteed response contract but does provide a mechanism for DNR response. The agreement also clarifies the two agencies' roles and provides for payment of suppression costs.

The Kittitas County Fire District #4 (Vantage) also will respond to fires on the Whiskey Dick Wildlife Area. A portion of the Wildlife Area on its southern boundary is located within the Fire District #4. Vantage Fire District personnel will respond to brush fires, but is an all-volunteer force with limited resources stationed out of Vantage.

Department Fire Management Policy: It is the Departments policy that wildlife area staffs are not firefighters and should not fight fires. Wildlife Area staff are trained in fire fighting and fire behavior, however, staff will only provide logistical support and information regarding critical habitat values to the Incident Commander of the responding fire entity.

Wildlife Habitat Concerns: The Wildlife Areas contains fire sensitive habitats that are critical to the survival of certain wildlife species. Shrub-steppe habitats can be degraded with the loss of species such as big sagebrush and antelope bitterbrush. Shrub-steppe obligate (dependant) wildlife species such as the sage grouse may be directly affected by large scale, uncontrolled fires. The loss of important browse plants for big game species such as mule deer can dramatically reduce the quality of mule deer winter range. Due to these concerns, WDFW requests that the Incident Commander or other fire fighting personnel on site notify WDFW personnel immediately in the order listed below. A WDFW Advisor will provide information to the Incident Commander regarding habitat concerns.

Aerial Support: The WDFW recommends that fire-fighting entities suppress fires on the Wildlife Areas as rapidly as possible. WDFW requests the Incident Commander to seek aerial support if needed to extinguish a fire on its land promptly. If, in the professional judgment of the Incident Commander, a fire on lands adjacent to one of the Wildlife Areas causes an immediate threat to the area, WDFW requests that he/she seeks aerial support as possible.

Reporting: Report any fire on or adjacent to the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas to the local fire district, WDNR, or WDFW (see local contact numbers below). The Central Washington Interagency Command Center (CWICC) coordinates all fire responses in this area and they will dispatch the appropriate fire-fighting entity. It is absolutely critical that any fire on the area is attacked as aggressively as possible during the initial attack. The importance of aerial support cannot be overstated.

Fire Districts – DIAL 911

NAME	TELEPHONE
Kittitas County Dispatch	509-925-8534
Kittitas County Fire District #4	509-856-2888

DNR- contact in order listed and request Operations or Staff Coordinator

NAME	TELEPHONE
DNR Dispatch (CWICC)	509-884-3473

The following table provides telephone numbers in priority order of Department staff to be contacted in the event of a fire.

Contact	Radio Number	Contact Number	
Cindi Confer, Wildlife Area Manager	Wildlife 547	509-925-6746	Work #
Wayne Hunt, WA Bio 2	Wildlife 548	509-925-6746	Work #
Jody Taylor, WA Assistant Manager	Wildlife 567	509-697-4503	Work #
Regional Office – Yakima		509-575-2470	
Regional Program Manager – Ted Clausing		509-457-9313	Work #

APPENDIX 4: WATER RIGHTS

Table 5. L.T. Murray Wildlife Area

File #	Stat	Doc	Priority Date	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS	QQ/Q
S4-095616C L	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12	
S4-095627C L	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12	
S4-095638C L	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12	
S4-095651C L	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12	
S4-093199C L	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 05	
G4-022516C L	A	Claim L		DG,ST					39	Kittitas	17.0N 17.0E 07	
S4-147871C L	A	Claim L		IR,ST		CFS		40	39	Kittitas	17.0N 17.0E 07	
G4-132016C L	A	Claim L		DG					39	Kittitas	17.0N 17.0E 08	
S4-093200C L	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 15	
S4-094360C L	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 15	
S4-094362C L	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 22	
S4-093188C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 07	
S4-093189C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 11	
S4-093190C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 11	
S4-093193C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15	
S4-093194C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15	
S4-093195C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15	
S4-093196C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15	
S4-093191C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 17	
S4-093192C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 17	
S4-094336C L	A	Claim L		ST,DG		CFS			39	Kittitas	18.0N 16.0E 19	

S4-093197C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 23	
S4-144934C L	A	Claim L		IR,ST			500		39	Kittitas	18.0N 17.0E 19	
S4-094326C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 20	
S4-094323C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 28	
S4-093198C L	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 32	
S4-098532C L	A	Claim L		ST		CFS			39	Kittitas	19.0N 16.0E 27	
G4-153416C L	A	Claim S		IR,ST					39	Kittitas	19.0N 16.0E 34	
S4-093187C L	A	Claim L		ST		CFS			39	Kittitas	19.0N 16.0E 34	
G4-24894A WRIS	I	NewA pp	03/01/77	IR,ST	200	GPM		200	39	Kittitas	19.0N 16.0E 35	

Table 6. Quilomene Wildlife Area

File #	Stat	Doc	Priority Date	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS	QQ/Q
S4-115633C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 01	
S4-115634C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 02	
S4-115628C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 05	
S4-115629C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 09	
S4-110721C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 03	
S4-115630C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 03	
S4-115632C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 21.0E 25	
S4-115627C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 21.0E 29	
S4-110723C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 22	SW/SW
S4-115631C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 22	SW/NE
S4-30344	A	NewA pp	4/30/90	WL,ST	0.002	CFS			40	Kittitas	19.0N 22.0E 22	S2SW
R4-01286C WRIS	A	Cert	7/10/64	WL		CFS	7.0		40	Kittitas	19.0N 22.0E 27	NW/SW
S4-01288C	A	Cert	9/2/64	WL	2	CFS			40	Kittitas	19.0N 22.0E 27	NW/SW

WRIS												
S4-01287C WRIS	A	Cert	11/12/64	WL,IR	1.7	CFS	60.0	15	40	Kittitas	19.0N 22.0E 27	SE/NE
S4-110722C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 33	
S4-110724C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 34	
S4-110725C L	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 35	

Table 7. Whiskey Dick Wildlife Area

File #	Stat	Doc	Priority Date	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS	QQ/Q
S4-099334C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 11	
S4-110718C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 12	
S4-110719C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 12	
S4-098535C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 14	
S4-098536C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 14	
S4-099329C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 03	
S4-110720C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 06	
G4-048139C L	A	Claim S		ST		GPM			40	Kittitas	17.0N 22.0E 11	
S4-099322C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 14	
S4-099325C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 15	
S4-099330C L	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 15	
G4-098537C L	A	Claim L		ST		GPM			40	Kittitas	17.0N 22.0E 18	
S4-099324C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 25	
S4-099323C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 35	
S4-099328C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 23	
S4-099333C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 29	
S4-099335C L	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 29	

S4-099332CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 30	
S4-099331CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 31	
S4-099326CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 33	
S4-099327CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 35	

APPENDIX 5: LITERATURE CITED

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Wildlife Area Statewide Plan (<http://wdfw.wa.gov/lands/lands2020/>)

WDFW policies and procedures (http://wdfw.wa.gov/depinfo/strat_goals_obj.htm)

Priority Habitat and Species List (<http://wdfw.wa.gov/hab/phslist.htm>)

Priority Habitat and Species Recommendations (<http://wdfw.wa.gov/hab/phsrecs.htm>)

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